THINGET

Inverter V5/F5 Series

User Manual

Xinje Electronic Co., Ltd.
2009.04

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V5/F5 Series

Inverter

User Manual

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This manual includes the basic caution items that you should obey to ensure your personal safety, as well as to protect the product and the connected equipments. These items are highlighted in the manual by a warning triangle. Please comply with the essential electric operation `rules that are not indicated in this manual.

Installing Precautions

Please comply with these items, incorrect operation may cause the system error working even abnormal. More serious would cause possession loss.

Correct Applications

The device and its components can only be used in the applications described in the catalog and the technical manuals, can only be connected with devices or components from other manufacturers which have been approved or recommended by Xinje.

The products will run normally in the condition of been transported, stored, configured and installed correctly, been operated and maintained as recommended.

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Obligation Declare

We have checked and confirmed that the contents in this manual were compatible with the hardware and software described. Since mistakes are hard to avoid, we cannot promise total accordant. This manual is subject to change without notices.

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Preface

——Essential introduction for this manual

Thank you for purchasing V5/F5 series inverter manufactured by Xinje Electronic Co., Ltd, this manual should be read and understood before attempting relevant operations.

1. Purpose of this manual

This manual offers guidance and introductions about how to use and maintains the inverter correctly, including functions, usages, installation, maintenance, etc.

2. Qualified personnel

This manual is intent for the following personnel:

- Inverter installation personnel
- Project technical personnel(electric engineer, electrician)
- Design personnel

The above personnel should read and understand this manual carefully before operating and debugging.

3. Validity of this manual

This manual may only be used for inverters made by Xinje.

4. Electronic Documents

In addition to our written manuals, we offer electronic documentations of our products by the following ways.

Ø User CD

There are software, user manual and application tip of relevant products.

Ø Website

Please visit Thinget Electronic Co.,Ltd. at www.xinje.com to obtain all variable electronic documents.

Safety Precautions
——Essential introduction about product operation

Upon unpacking, please confirm that: Check whether the model and the rated values on the nameplate of the inverter are in accordance with your order. Check if there is any damage occurred during transportation; pleases contact us or the distributor if you find any missing or damage of the products.

In order to use this product correctly, the user who uses the product for the first time must read this manual carefully and pay close attention to the safety precautions.

Please keep this manual properly, hand it to the terminal user and lay it on the place where the operators can read it easily.

◎ Safty Precautions ◎

Confirmations Upon Delivery

Notice
1. Never install an inverter that is damaged or missing components. Doing so can result in injury.

Ⅰ Installation

Notice
1. Always hold the bottom of the inverter when carrying it. If the inverter is held by the front cover, the main body of the inverter

may fall, possible resulting in injury.

2. Attach the inverter to metal or other noncombustible materials. Fire can result if the inverter is attached to a combustible material.
3. Install a cooling fan or other cooling device when installing more than one inverter in the same enclosure so that the temperature of the air entering the inverters is below 45℃. Overheating can result in fires or other accidents.

l Wiring

Danger

1. Always turn off the input power supply before wiring. Otherwise, an electric shock or fire may occur.
2. Wiring must be operated by an authorized person qualified in electrical work. Otherwise, an electric shock or fire may occur.
3. Make sure to ground the ground terminals. Otherwise, an electric shock or fire may occur.
4. Always check the operation of any emergency stop circuits after they are wired. Otherwise, possibly result in injury (user responsibility for the wiring).
5. Never touch the output terminal directly by your hands or let the output terminals to come into contact with the inverter case. Never short the output terminals. Otherwise, an electric short or ground short may occur.
6. Never touch the internal circuit or the zero-component until power off and the charge indicator is off as there may still be high voltage

inside the AC motor dirver.

Notice

1. Confirm that the voltage of the main AC power supply satisfies the rated voltage of the Inverter. Injury and fire may occur if the voltage is not right.
2. Do not perform voltage withstand tests on the Inverter. Otherwise, semiconductor elements and other devices can be damaged.
3. Connect braking resistors, Braking Resistor Units, and Braking Units as shown in the I/O wiring examples. Otherwise, a fire may occur.
4. Tighten all terminal screws to the specified tightening torque. Otherwise, a fire may occur.
5. Do not connect AC power to output terminals U, V, and W. The interior parts of the Inverter will be damaged if voltage is applied to the output terminals.
6. Do not connect phase-advancing capacitors or LC/RC noise filters to the output circuits.The Inverter may be damaged or internal parts burnt if these devices are connected.
7. Do not connect electromagnetism switch, electromagnetism contactor to output circuit. When the inverter is running with load, the electromagnetism switch and electromagnetism contactor will generate inrush current which will cause inverter’s over current protection.
8. Do not disassemble the whole front cover as disassembling the top front while wiring is ok. Otherwise, inverter internal parts may be damaged.

Maintenance and Inspection

Danger
1. Do not touch the inverter terminals, as they may carry high voltage. Otherwise, an electric short may occur. 2. Make sure to have protective cover .Always have the protective cover in place when power is being supplied to the Inverter. When attaching the cover, please with the power turns off. Otherwise, an electric short may occur. 3. Maintenance, inspection, must be performed only by authorized personnel. Otherwise, an electric short may occur.
Notice
1. A CMOS IC is used in the control board. Handle the control board and CMOS IC carefully. The CMOS IC can be destroyed by static electricity if touched directly. 2. Do not change the wiring, or remove connectors or the Digital Operator, during operation. Otherwise, The devices may be damaged.

◎ Usage Precautions ◎

Ø Constant torque low speed running

When the inverter outputs to a common motor at low speed for a long term, the output rated torque should be derated due to the worsening radiating effect. If low speed constant torque long term running is required, then a special variable frequency motor is needed.

Ø Motor insulation

When using the V5/F5 series inverter, make sure to confirm the insulation of the motor which will be used to avoid device damage. Besides, do the periodic check for the insulation condition of the motor located in the bad environment to guarantee the system can operate safely.

Ø Negative torque load

If in the case of improving load, negative torque may occur. Braking units should be connected with the inverter, or over current and over voltage fault may happen.

Ø Mechanical resonance point of load

The inverter may encounter the mechanical resonance point of load within certain output frequency range. Jump frequencies have to be set to avoid it.

Ø Capacitor and resistor

Because the inverter output pulse wave, capacitor and resistors shouldn't be connected with the output terminals of the inverter, or the inverter may trip or components may be damaged; Besides, don’t connect switch components such as air switch and contactor with the output terminals is

recommended, as shown in Fig.0-1(If switch components need to be connected with the output terminals, make sure output current of the inverter is zero when switch is acting).

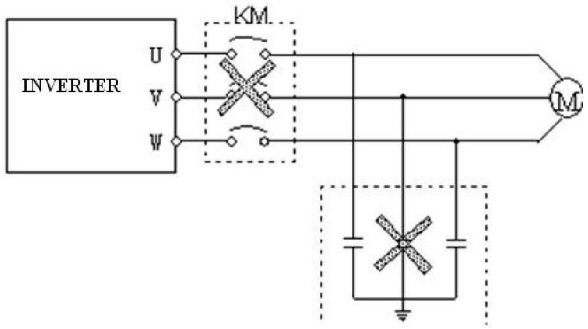


Fig.0-1 Capacitor is prohibited to be connected with output terminals of inverter

Ø **Derate according to basic frequency setting**

When the basic frequency is lower than the reference frequency, please consider duration for the motor so as to avoid motor's damage caused by overheating.

Ø **Running at frequency above 50Hz**

If running at frequency above 50Hz, besides the increment of vibration and noise, the ranges of running speed of motor shaft and mechanical device have to be guaranteed. Be sure to make an enquiry first.

Ø **The electro-thermal protective value of motor**

If the applicable motor is selected as per requirements, the inverter can perform the thermal protection to the motor. If the ratings of applied motor are not in compliance with the inverter, be sure to adjust the protective value or adopt other protective measures to guarantee the safe

running of motor.

Ø **Altitude and derate**

When the altitude is higher than 1000m, the cooling effect of inverter is deteriorated because of the rareness of air, deration must be considered, shown in Fig.0-2 which indicates the relationship between the altitude and rated current of frequency inverter.

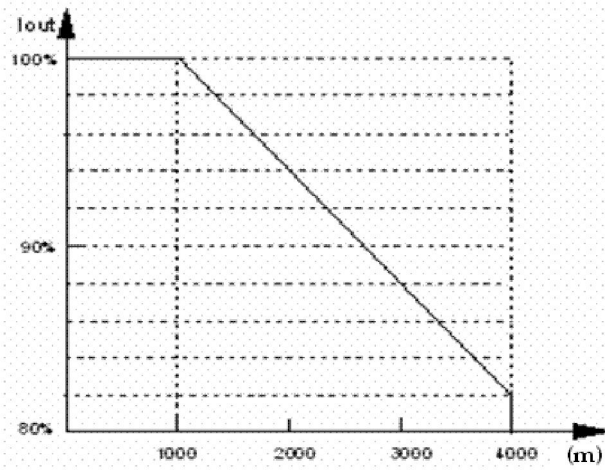


Fig. 0-2 The relationship between the altitude and rated current of frequency inverter

Ø **About protection classes**

The protection class of V5/F5 series inverter IP20 is reached in the case of status display unit or keyboard.

◎ Note For Scrap ◎

When you scrap the inverter, please pay attention to:

Explosion risk of capacitor: The capacitors in the main circuits may explode when they are burned.

Waste gas when plastic parts are burned: Poisonous gas may be generated when front panel is burned.

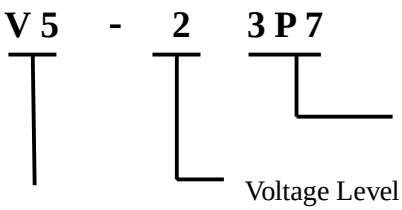
Dispose method: Please dispose as industrial rubbish.

1 Product Instruction

1-1. Product overview

V5/F5 series inverter is produced by Thinget Co., Ltd with high performance, easy operating and low noise. It is a innovative product with a series advanced and practical running and control functions such as practical PI, flexible input and output terminals, parameter modification online, fixed length control, traverse operation, RS485 control, bus-mastering. It provides OEM customers with high integrated, reliable, cost-effective solution.

Name Designation Rules



Inverter Series
V5: VVVF/vector control
VB5: VVVF/vector control
(B means black cover)

Voltage Level
2：220V
4：380V

Max Suitable Motor's Capacity
011：11KW
1P5：1.5KW
And so forth
（P：Stands for radix Point)

V5/VB5 series frequency inverter has 220V and 380V voltage levels. Suitable motor capability is from 0.75KW to 55KW.

Please note 220V level VB5 series have no vector control.

Type

Voltage level	Inverter types	Rating capacity (KVA)	Rating output current (A)	Suitable motor (KW)
220V Single phase	V5-20P7	1.5	4.7	0.75
	VB5-20P7	1.5	4.7	0.75
	V5-21P5	2.8	7.5	1.5
	VB5-21P5	2.8	7.5	1.5
380V Three phase	V5-41P5	2.5	4.5	1.5
	VB5-41P5	2.5	4.5	1.5
	V5-42P2	3.0	6.0	2.2
	VB5-42P2	3.0	6.0	2.2
	V5-43P7	5.9	9.6	3.7
	VB5-43P7	5.9	9.6	3.7
	V5-45P5	8.5	14.0	5.5
	V5-47P5	11	17.0	7.5
	V5-4011	15	25	11
	V5-4015	20	33	15
	V5-4018	25	38	18.5
	V5-4022	30	46	22
	V5-4030	40	60	30
	V5-4037	50	75	37
	V5-4045	60	90	45
	V5-4055	75	110	55

1-2. Product technical specification

1. Technical specification

220V

Type V5/VB5-2 _ _ _		**0P7**	**1P5**
Output	Match Motor(KW)	0.75	1.5
	Output Current(A)	4.7	7.5
	Voltage(V)	AC 200	
	Frequency Range(Hz)	0~500	
	Frequency Resolution(Hz)	0.01	
	Over-loading Ability	150%Rated Current for 1 minutes，180% Rated Current for 1 second	
Input	Rated Voltage/Frequency	Single-phase 220V,50/60Hz	
	AC voltage permit fluctuate range	Voltage：-20% ～ +20% Voltage Unbalance Rate：<3%	
	Frequency fluctuate Range	Frequency：±5%	
	Power Capacity（KVA）	1.5	2.8

380V-table 1

Model V5/VB5-4_ _ _		**1P5**	**2P2**	**3P7**	**5P5**	**7P5**
Output	Motor(KW)	1.5	2.2	3.7	5.5	7.5
	Output Current(A)	4.0	6.0	9.6	14.0	17.0
	Voltage(V)	AC 380				
	Frequency Range (Hz)	0 ～500				
	Frequency accuracy (Hz)	0.01				
	Over load Ability	150% Rated Current for 1 minute，180% Rated Current for 1 Second				
Input	Rated Current /Frequency	Three-phase 380V；50Hz/60Hz				
	AC voltage fluctuate range	Voltage：-20% ～ +20% Voltage Unbalance Rate：<3%				
	Frequency fluctuate range	Frequency：±5%				
	Power Capacity（KVA）	2.5	3.0	5.9	8.5	11

380V-table 2

Model V5/F5-4_ _ _		011	015	018	022	030
Output	Motor(KW)	11	15	18.5	22	30
	Output Current(A)	25	35	38	30	40
	Voltage(V)	AC 380				
	Frequency Range (Hz)	0 ～500				
	Frequency accuracy (Hz)	0.01				
	Over load Ability	150% Rated Current for 1 minute，180% Rated Current for 1 Second				
Input	Rated Current /Frequency	Three-phase 380V；50Hz/60Hz				
	AC voltage fluctuate range	Voltage：-20% ～ +20% Voltage Unbalance Rate：<3%				
	Frequency fluctuate range	Frequency：±5%				
	Power Capacity（KVA）	15	20	25	30	40

Common characteristics

Environment	Application environment	In-door, free from direct sunlight, dust, corrosive gas, oil mist, steam, water drop etc.
	Elevation	Lower than 1000m（The inverter should be derated when the elevation is higher than 1000m ）
	Ambient Temperature	－10℃～＋40℃

	Humidity	Less than 90%RH，No dry bulb
	Vibration	Less than 5.9 m/s^2（0.6M）
	Storage Temperature	－20℃～＋60℃
Structure	Protect Configuration	IP20(In the state of "state display units" or "keyboard"）
	Cooling Manner	Fan cooling
Installation		Wall mounted or install inside cabinet

2. General Specification

Main Control Function	Modulation mode	Optimized space voltage vector SVPWM modulation
	Control mode	SVPWM control (dead zone compensation for optimized low-frequency)
	Frequency precision	Digital Setting: max frequency×±0. 01%； Analog Setting: max frequency×±0.2%
	Frequency resolution	Digital Setting：0.01Hz； Analog Setting：max frequency×0.1%
	Start frequency	0.40Hz～20.00Hz
	Torque boost	Auto torque boost，manual torque boost 0.1%～30.0%
	V/F curve	Five modes：constant torque V/F curve, 1 V/F curve mode by user and 3 kinds of torque-derating modes (2nd power, 1.7th power, 1.2nd power)
	Accelerate/Decelerate curve	Two modes：linear Acc/Dec, S curve Acc/Dec； seven kinds of Acc/Dec time (Maximum:6000

		minutes) and unit(minute or second) is selectable.
	DC braking	Initial frequency of DC braking：0～15.00Hz Braking time：0～60.0 s Braking current：0～80%
	Power consumption braking	Power consumption unit inside, can be connected with external braking resistor
	Jog	Range of jog frequendy：0.1Hz～50.00Hz, Acc/Dec time of jog operation 0.1～60.0s
	Internal PI	Be able to form close loop control system easily
	Multi-step speed running	Multi-step speed running can be realized by internal PLC or control terminals
	Textile wobble frequency	Adjustable preset frequency and center frequency
	Auto voltage regulation (AVR)	When the power system voltage changes, maintain the constant of output voltage

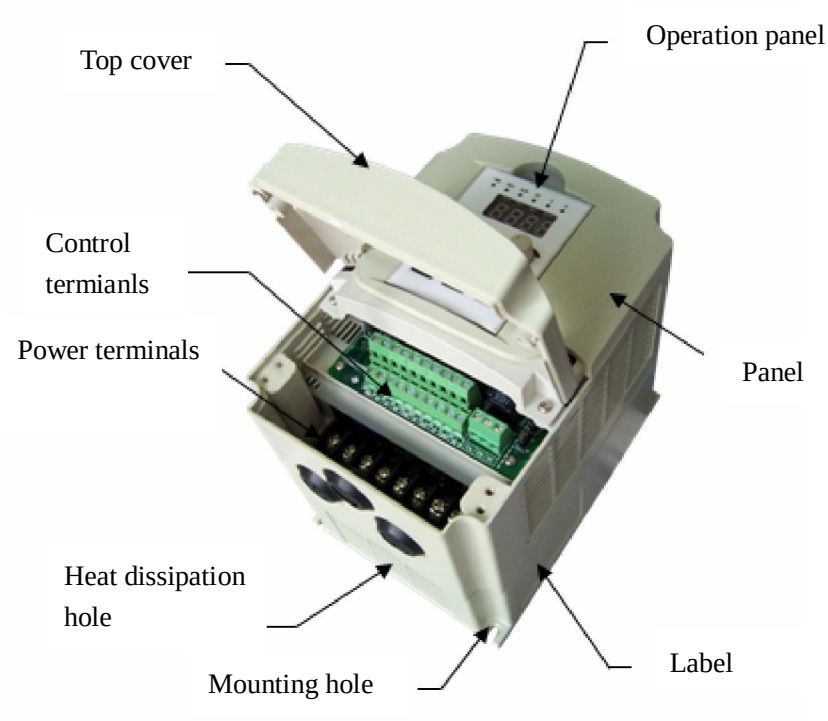
	Auto energy saving running	V/F curve is optimized automatically according to the load condition to realize energy saving operation
	Auto current limiting	running current is limited automatically to avoid trip caused by overcurrent
	Fix-length control	The frequency inverter will stop running when reaching the fixed length
	Communication function	With RS485 port, support Modbus-RTU protocol. Be with master-slave multi-devices linkage function

Operating function	Running command channel	Operation panel setting；control terminals setting；serial port setting；three modes are exchangeable.
	Frequency setting channel	Keyboard analog potentiometer setting；▲,▼ keys setting；function code digital setting; serial port setting；UP/DOWN terminal setting；analog voltage setting；analog current setting; pulse setting；combination setting; different setting modes can be selected
	Digital input channel	Forward/Reverse running command；6 channels programmable digital input，can set 35 kinds of function，X6 support 0~20KHz pulse output
	Analog input channel	2 channels analog input ，4～20mA and 0～10V can be selected
	Analog output channel	1 channel analog output， 0～10V, be able to output setting frequency, output frequency
	Digital, pulse output channel	1 channel programmable open-collector output; 1 channel relay output; 1 channel 0-20KHz pulse output
Operation panel	LED Display	Can display setting frequency, output voltage, output current and other parameters.
	External meter Display	Display output frequency, output current, output voltage and other physical quantities
	Button Lock	Lock all the buttons
	Parameter Copy	Function code copy among frequency inverters by remote keyboard
Protection Function		Over current protection；over voltage protection；

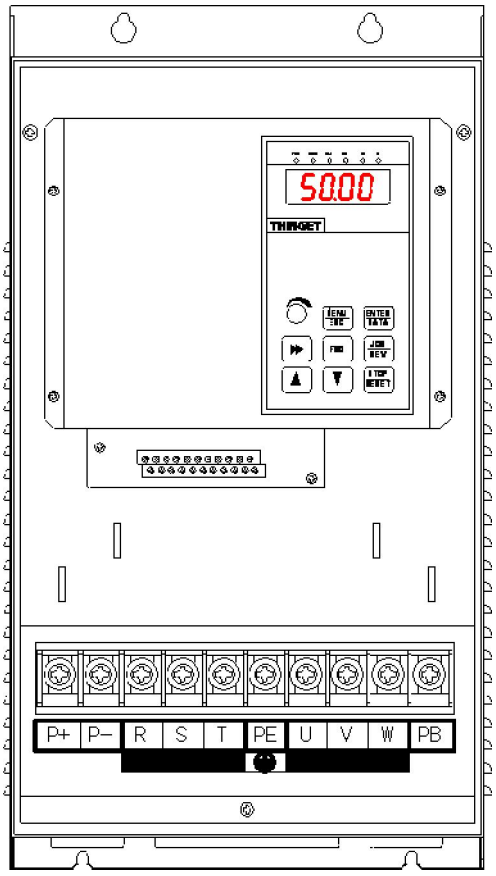
	under voltage protection；over heat protection；over load protection
Optional parts	Braking parts, operation panel installation seat, operation panel extension cable

1-3. Product appearance:

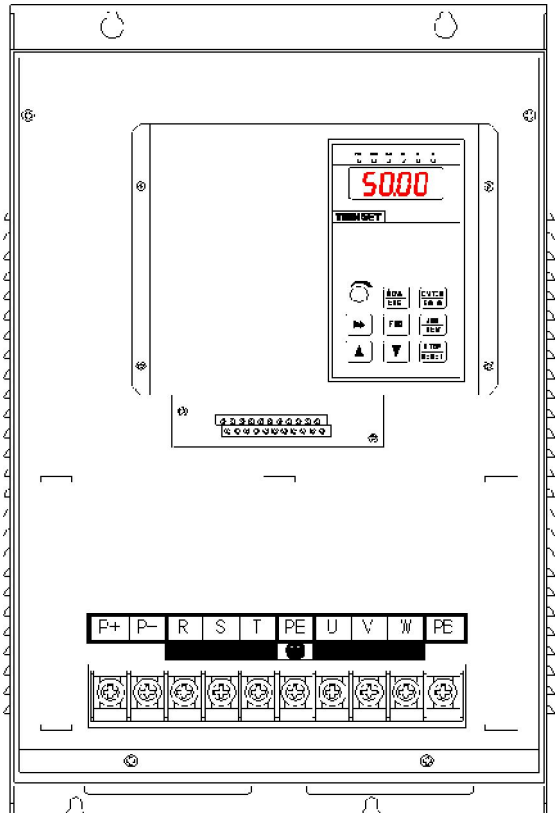
V5/F5 series 0.75~7.5KW



V5/F5 series 11~18.5KW

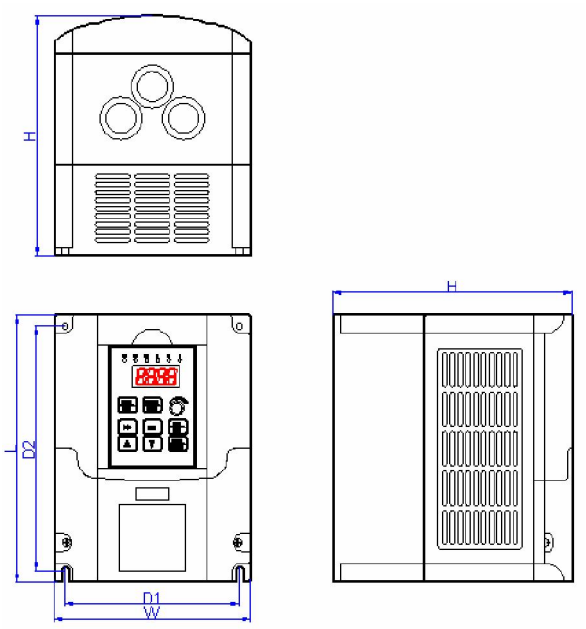


V5/F5 series 22~30KW



1-4. Product dimension

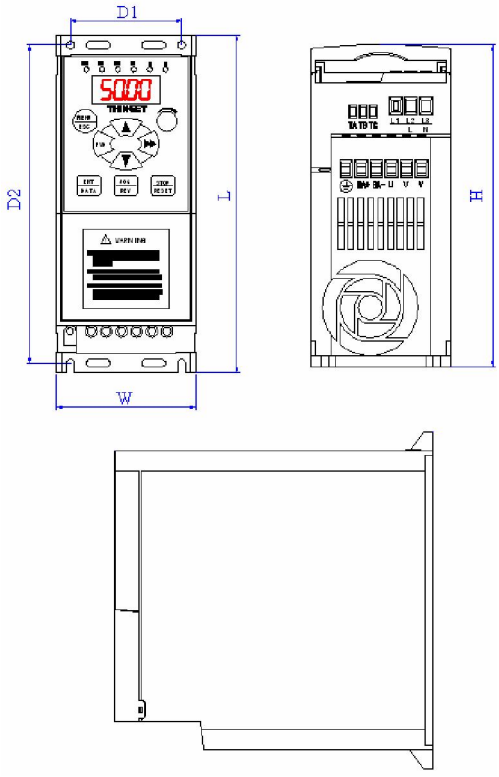
V5 series 0.75~7.5KW unit:mm



Type	W	D1	L	D2	H
V5-20P7	125	113	169	157	158
V5-21P5					
V5-41P5					
V5-42P2	151	139	217	205	171
V5-43P7					

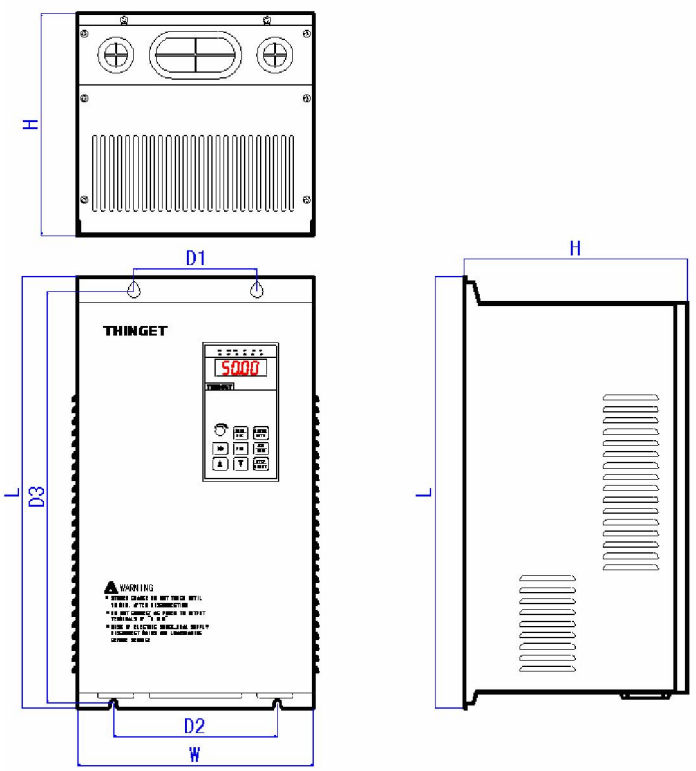
Type	W	D1	L	D2	H
V5-45P5	220	208	300	288	210
V5-47P5					

VB5 series 0.75~3.7KW unit:mm



Type	W	D1	L	D2	H
VB5-20P7	70	56	170	160	162
VB5-21P5					
VB5-41P5	80	56	200	190	162
VB5-42P2					
VB5-43P7					

V5 series 11~30KW unit:mm



Type	W	D1	L	D2	H	D3
V5-4011	230	120	420	160	218	400
V5-4015						
V5-4018						
V5-4022	290	180	450	210	217	430
V5-4030						

1-5. Choose fittings

Ø Braking Resistor

0.75~18.5KW series inverters have braking unit inside. If you have the requirements of power consumption braking, choose braking resistor /unit according to table 1-1, 22KW and above inverters need to connect braking unit. The braking resistor connection method is shown as below:

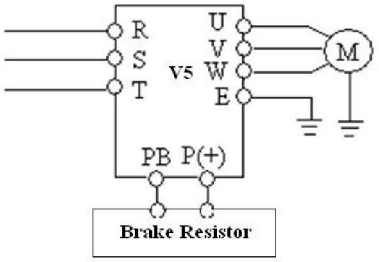


Figure 1-1 Wiring of inverter and brake units

Each power level inverter is corresponding to the following connection method:

0.75～3.7KW　　5.5～18.5KW　　22～30KW

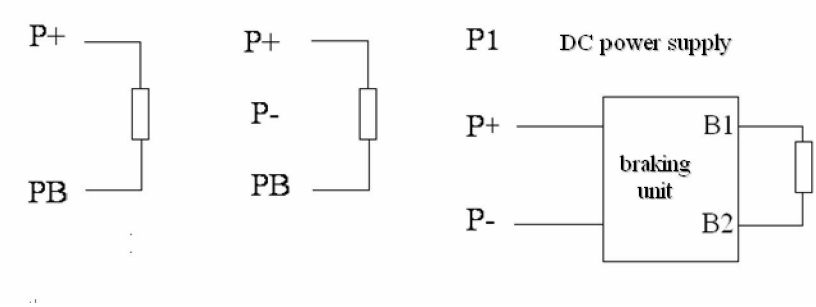


Table 1-1 Braking resistor selection

Spec (KW)		Braking unit		Braking resistor	
		Sepc	Qty.	Equivalent braking resistor (Ω)	Equivalent braking power (W)
220V	0.75	Built inside	1	150	200
	1.5		1	100	400
380V	1.5		1	300	400
	2.2		1	200	500
	3.7		1	200	500
	5.5		1	100	500
	7.5		1	75	1000
	11		1	50	1000
	15		1	40	1500
	18.5		1	32	5000
	22	BRU-4045	1	27.2	5000
	30		1	20	6000

Ø **Operation panel mounting seat**

There are two kinds of operation panel mounting seat, one is for 3.7KW and below inverters, another is for 5.5KW~7.5KW inverters.

Opearation panel	Mounting seat	Power (KW)	Suitable type	Dimension W*H（mm）
V5-OPU-01	V5-OPU-01F	0.75~3.7	V5	62*94
V5-OPU-02	—	5.5~7.5	V5	71*131
VB5-OPU-01	—	0.75~3.7	VB5	62*75
V5-OPU-03	—	11~30	V5	71*131

Ø **Operation panel extension cable**

The frequency inverter will be attached with 0.3m extension cable when out of factory. Besides, we also provide 0.5m, 1.0m, 1.5m extension cable.

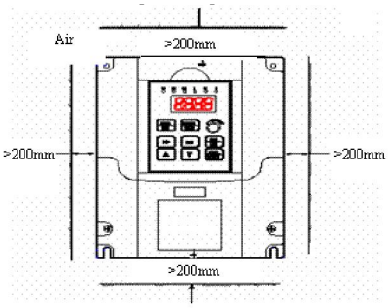
Cable type	Length (m)
V5-ECC-05	0.5
V5-ECC-10	1.0
V5-ECC-15	1.5

2 Installation and Wiring

2-1. Installation environment

2-1-1. Environment requirement

- Ambient tempeature: It is required to be within the range of -10ºC~40ºC. The inverter should be derated when the temperature over 40ºC, at the same time ventilation and heat dissipation should be enhanced.
- Far away from the location with direct sunlight, dust, floating fiber



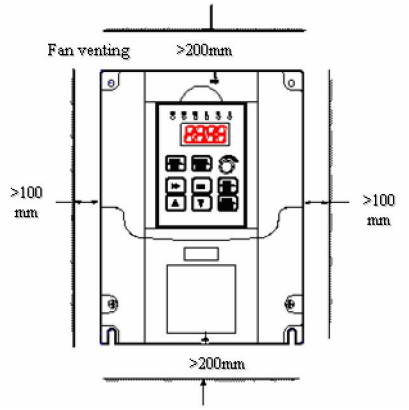


Fig. 2-1 Mounting Space

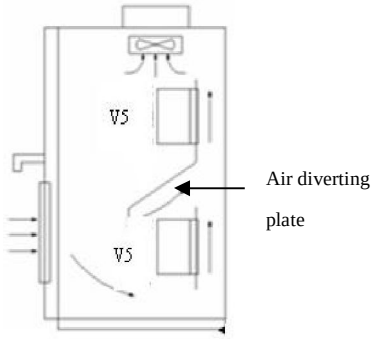


Fig.2-2 Mounting of Multi-Inverters

2-1-3. Mounting and removing

- Ø Removing: Romove the four screws on the cover with phillips screwdriver
- Ø Mounting: Allign the mounting holes and then fix the screws.

2-2. Wiring

Caution

- Wiring after power off for at least 10 minutes, otherwise, an electronic short may occur.
- Do not connect AC power to output terminals U, V and W.
- Both the inverter and the motor should be safety grounded as there is leakage current inside the inverter.The diameter of grounding copper cable must be more than 3.5mm², grounding resistor must be less than 10ohm.
- Withstand voltage test of the inverter has been done in the factory, users would better not do it again.
- Do not install electromagnetic contactor, absorption capacitor or other resistance-capacitance absorption devices, as shown in Fig2-3.
- In order to make the input over-current protection and power off maintenance easily, the inverters should connect power supply via braker.
- The connection cable of relay I/O circuit (X1~X6, FWD, REV, OC, DO) should select the twisted-pair or shield cable with diameter over 0.75 mm². One terminal of the shield layer should be hung in the air and the other terminal should be connected with the inverter's grounding terminal E, the cable length should be less than 50m.

Danger

- Before layout operation, make sure the power supply of inverter is cut off, all the LED on the operate panel is black out and delay for more than 10 minutes.
- Wiring work can be performed after the voltage between internal electrolesis capacity "+" and "–" is below DC36V.
- Wiring work can only be done by trained and professional personnel.
- Before power on, please check if the power supply voltage is consistent with the inverter voltage level, otherwise device damage, human injuries and deaths may occur.

2-3. Wiring of main circuit terminals

2-3-1. Wiring diagram

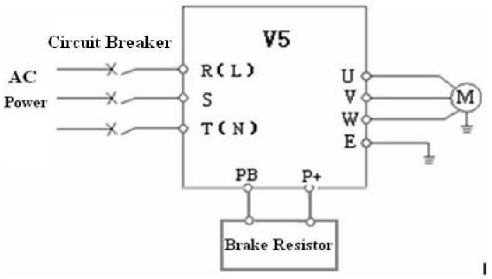


Fig. 2-3 Wiring of main circuit

2-3-2. Terminal assignment and description

Fig.A

Fig .B

Fig.C

Fig.D

Fig.E

Fig.F

Fig.G

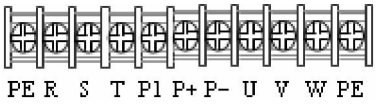


Fig.H

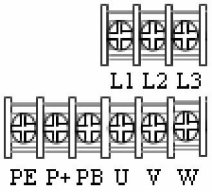
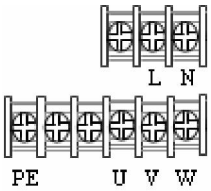


Fig.I



The relationship between main circuit terminals and inverter types:

Voltage	Power (KW)	Figure	Remark	Types
220V	0.75～1.5	Figure A	White cover	V5
		Figure I	Black cover	VB5
380V	1.5	Figure B	White cover	V5
		Figure H	Black cover	VB5
	2.2～3.7	Figure C	White cover	V5
		Figure H	Black cover	VB5

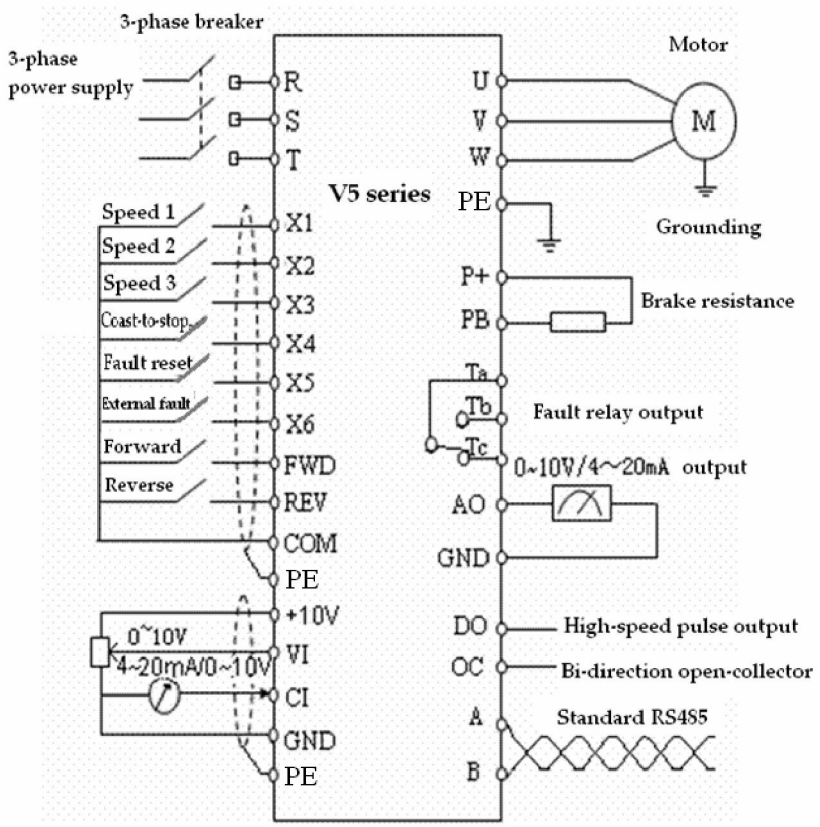
	5.5～7.5	Figure D	White cover	V5
	11～18.5	Figure E	Black iron cover	V5
	22～30	Figure F	Black iron cover	V5

Main circuit I/O terminals are shown in table 2-1:

Table 2-1 main circuit I/O terminals

Voltage	Terminal	Function
V5/F5 series 220V single phase	L、N	Single phase AC220V input terminals
	U、V、W	Three phase AC output terminals
	P+、PB	Braking resistor terminals
	PE	Grounding terminal
V5 series Three phase 380V	R、S、T	Three phase AC380V input terminals
	U、V、W	Three phase AC output terminals
	P+、P-	Bus +, - terminals
	P+、PB	Braking resistor terminals
	PE	Grounding terminal
VB5 series Single phase 220V	L、N	Single phase AC220V input terminals
	U、V、W	Three phase AC output terminals
	PE	Grounding terminal
VB5 series Three phase 380V	L1、L2、L3	Three phase AC380V input terminals
	P+、PB	Braking resistor termianls
	U、V、W	Three phase AC output terminals
	PE	Grounding terminal

2-4. Basic running wiring



Note:

(1) V5-41P5 without PE terminals (grounding terminal)

(2) P- terminal only can be used in 5.5KW and above intervers.

(3) L, N terminals are only suitable for 220V single phase inverters.

(4) L1, L2, L3 terminals are suitable for VB5 three phase inverters.

(5) VB5 series inverters are lack of 1 channel digital input X5, 1 channel analog input VI and DO.
(6) VB5 single phase inverters are lack of X4, X5, X6, VI, AO, OC, DO, P+, P-, PB terminals.

2-5. Setting and wiring of control circuit

2-5-1.Position and function of terminals and jumpers on control panel

0.75KW~7.5KW V5 series inverter

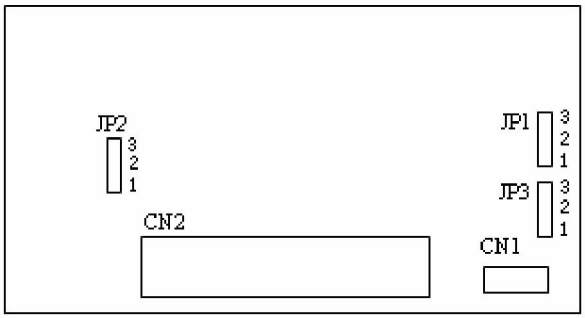


Fig. 2－4 (a) position of terminals and jumpers on control panel

0.75~1.5KW VB5 series single phase inverter

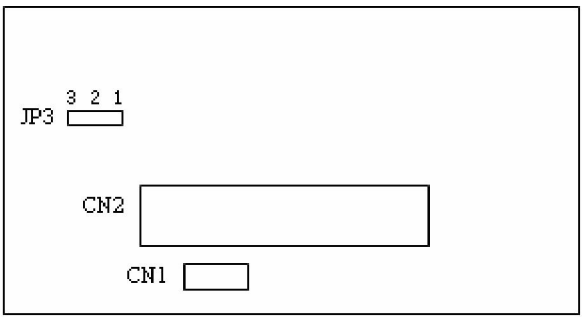


Fig. 2－4 (b) position of terminals and jumpers on control panel

1.5~3.7KW VB5 series three phase inverter

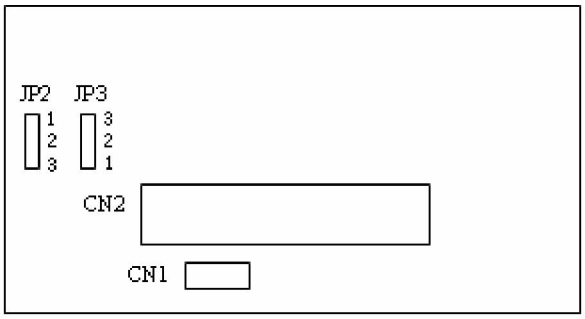


Fig. 2－4 (c) position of terminals and jumpers on control panel

11~30KW V5 series inverter

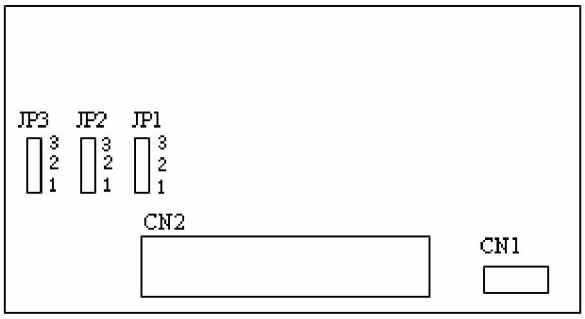


Fig. 2－4 (d) position of terminals and jumpers on control panel

The position of terminals and jumpers on control panel are shown in Fig. 2-4, the function descriptions of terminals are shown in Table 2-3 and the function descriptions of jumpers and their setting method are shown in Table2-2. Before running the inverter, make sure terminals wiring and jumpers setting have been done, more than $1mm^2$ cables are recommended to use.

Table 2-2 Function of jumpers

Jumper	Function	Setup	Default
JP1	Pulse output terminal DO power selection	1－2 connect：External power supply 2－3 connect： Inverter's internal 24V power supply	External power supply
JP2	Analog output terminal AO output	1－2 connect： 4~20mA， AO terminal outputs current signal 2－3 connect：0~10V，AO terminal outputs voltage signal	0~10V
JP3	CI current/voltage input modes selection	1－2 connect ：V side：0~10V voltage signal 2－3 connect ：I side：4~20mA	4~20mA

		current signal	

NOTICE: JP1 of VB5 series single inverters are CI terminal.

2-5-2.Description of terminals on control panel

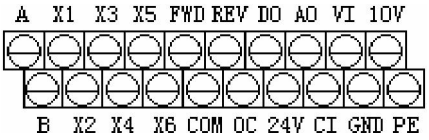
1. Functions of CN1 terminal are shown as below in Table 2-3：

Table 2-3 Function of CN1 on control panel

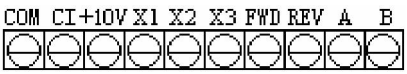
Type	Terminal	Name	Function Description	Specification
Relay output terminal	TA	Inverter Multi-function relay output terminals	Inverter Multifunctional relay output terminals. Please refer to terminal function parameters P4.11 and description of output terminals	TA-TC: normal close, TA-TB: normal open Contact Capacity： AC250V/2A (COSΦ=1) AC250V/1A (COSΦ=0.4) DC30V/1A
	TB			
	TC			

2. Control circuit terminals CN2

V5series
0.75～7.5KW



VB5series
single phase
0.75～1.5KW



VB5 series
three phase
1.5～3.7KW

V5 series
11～30KW

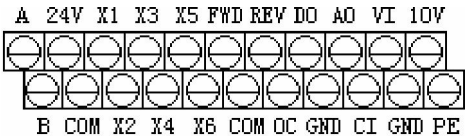


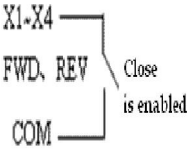
Fig. 2-5 Terminals on control panel

3. CN2 terminals' function description are shown as below：

Table 2-4 CN2 terminals' function description

Type	Terminal	Name	Terminal Function Description	Specification
Communication	A	RS485 port	Positive terminal of RS485 differential signal	standard RS485 port, please use twisted cable or shielded cable
	B		Negative terminal of RS485 differential signal	

Multifunction output terminal	OC	Open collector output terminal 1	Multi-function digital output terminal, Refer to output terminals' function description of terminal function parameters P4.10 for details. (common terminals：COM)	optical coupling isolation output voltage range:9~30V max output current:50mA usage please refer to P4.10
Pulse output terminal	DO	Open collector pulse output terminal	Multi-function digital output terminal, Refer to output terminals' function description of terminal function parameters P4.20, P4.21 for details (common terminals：COM)	Output frequency range： Decided by function code P4.21, highest 20KHz
Analog input	VI	Analog input VI	analog voltage input (reference ground：GND)	Input voltage range：0~10V (input resistance：47KΩ) accuracy：1/1000
	CI	Analog input CI	Analog current/voltage input, voltage and current are selected by jumper JP3 and the default is current. (reference ground：GND)	Input voltage range：0~10V (input resistance：47KΩ) Input current range：4~20mA (input resistance：500Ω) accuracy：1/1000

<table>
<tr><td>Analog output</td><td>AO</td><td>Analog output AO</td><td>Analog voltage/current ouput， They are selected by jumper JP2 and the default is voltage which can indicate 7 values. (reference ground：GND)</td><td>Voltage output range：0~10V
Current output range：4~20mA</td></tr>
<tr><td rowspan="2">Running control terminal</td><td>FWD</td><td>Forward running command</td><td rowspan="2">Forware/reverse digital command.
Refer to P4.08 for details (instruction about 2-wire and 3-wire control function).</td><td rowspan="8">Optical coupling isolation input
Input resistance: R=2KΩ
Highest input frequency:200Hz
Input voltage range: 9～30V
 
</td></tr>
<tr><td>REV</td><td>Reverse running command</td></tr>
<tr><td rowspan="6">Multifunction input terminal</td><td>X1</td><td>Multifunction input 1</td><td rowspan="6">Multi-function digital input terminals, refer to input terminals' function description in terminals' function parameters P4. (common terminal：COM)</td></tr>
<tr><td>X2</td><td>Multifunction input 2</td></tr>
<tr><td>X3</td><td>Multifunction input 3</td></tr>
<tr><td>X4</td><td>Multifunction input 4</td></tr>
<tr><td>X5</td><td>Multifunction input 5</td></tr>
<tr><td>X6</td><td>Multifunction input 6</td></tr>
<tr><td>Power supply</td><td>24V</td><td>+24V power supply</td><td>Offer +24V power supply (negative terminal：COM)</td><td>-</td></tr>
</table>

	10V	+10V power supply	Offer +10V power supply (negative terminal：GND)	Max output current:50mA
	GND	+10V power supply common terminal	Reference ground of analog signal and +10V power supply	COM is isolated with GND inside inverter
	COM	+24V power supply common terminal	Digital signal I/O common terminal	

2-5-3. Analog input/output terminal wiring

1. VI terminal voltage signal input，wiring is shown as below:

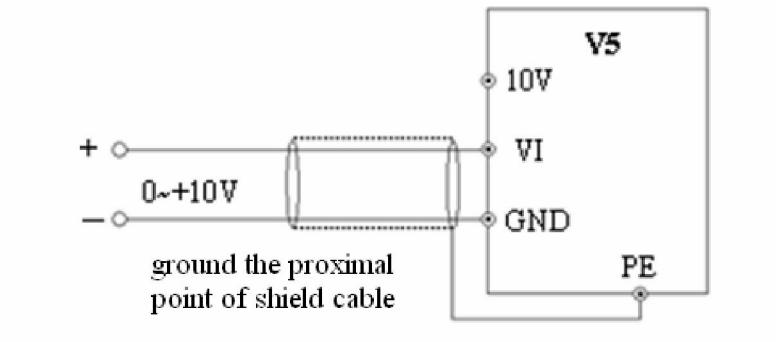


Fig. 2-6 VI terminal wiring diagram

2. CI terminal analog input, jumper select voltage input(0~10V) or current input(4~20mA), wiring is shown as below:

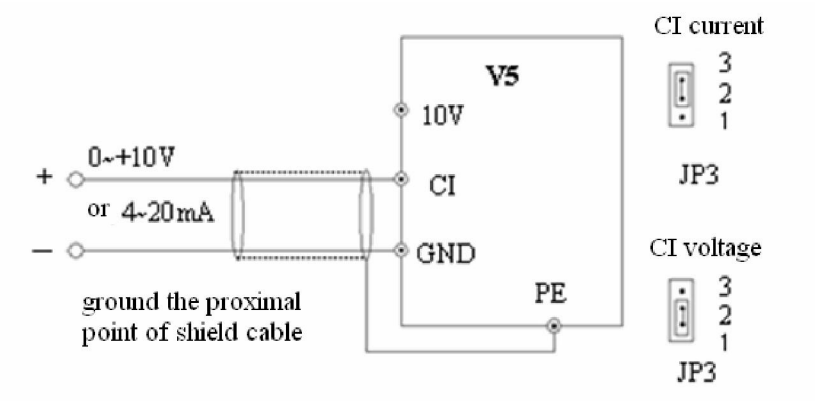


Fig. 2-7 CI terminals' wiring

3. Wiring for analog ouput terminal AO

Analog output terminal AO can display various physical quantities when connecting external analog meter, output voltage 0~10V, output current 4~20mA, wiring is shown in Fig.2-8.

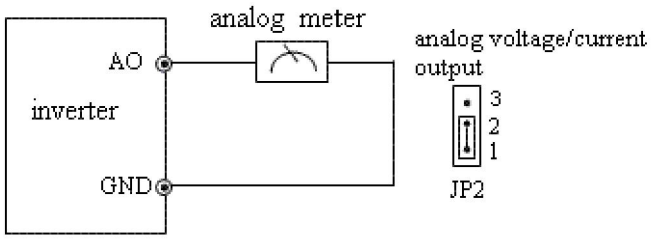


Fig. 2-8 Analog output wiring

Note:

(1) When using analog input, you can connect filter capacitor or common mode inductor between VI and GND, or CI and GND.

(2) Because analog input signal is easily interfered by outside, the shield cable is required, the cable length must be short and the shield layer must be grounded well.

2-5-4. Connection of communication terminals

The communication port of this inverter is standard RS485 port.

With the following wiring methods, you can buildup control system of one host with one slave or one host with several slaves. Also, you can realize the functions such as real time monitor, remote control, high level automation and others for the inveter with the host (PC or PLC) software.

Ø Connection of inverter's RS485 port and the host:

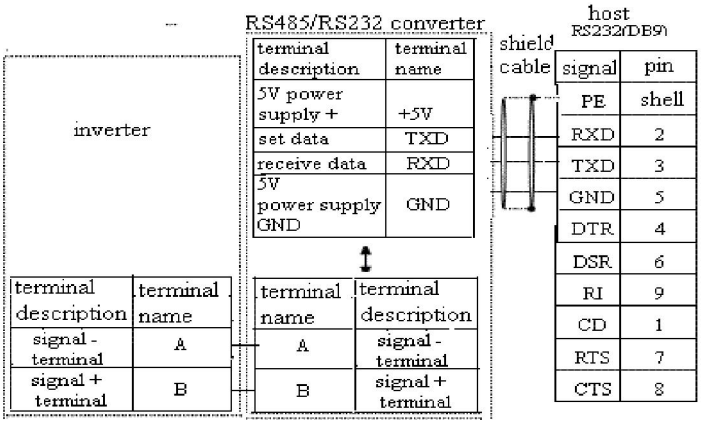


Fig. 2-9 RS485-(RS485/232)-RS232 cable connection

Ø More than one inverters can be connected through RS485 with the PLC(or PC) as the host, as shown in Fig.2-10; Also, you can select one inveter as host and the other inverters as slaves, as shown in Fig.2-11.Because with increasing of the inverter's quantities, the communication system will be interfered easier, the following wiring is recommended.

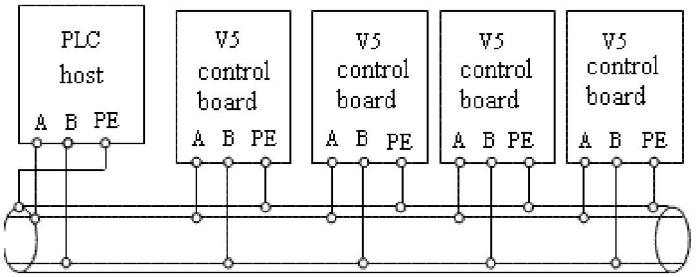


Fig. 2-10 Connection of PLC and inverters

(Inverters and motors are all grounded well)

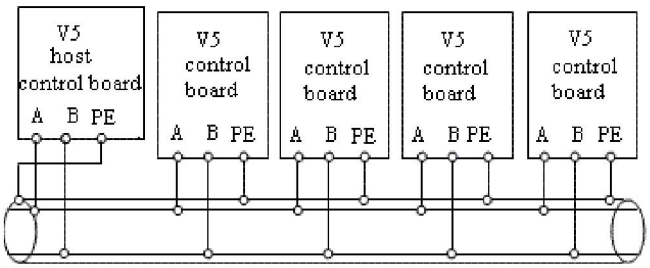


Fig. 2-11 Connection of several inverters

(Inverters and motors are all grounded well)

If the communication is still failed with the above connection methods, you can adopt the following measures:

(1) Use separate power supply for PLC or isolate the power supply.

(2) Use magnetism ring for the cable and reduce the inverter's carrier frequency.

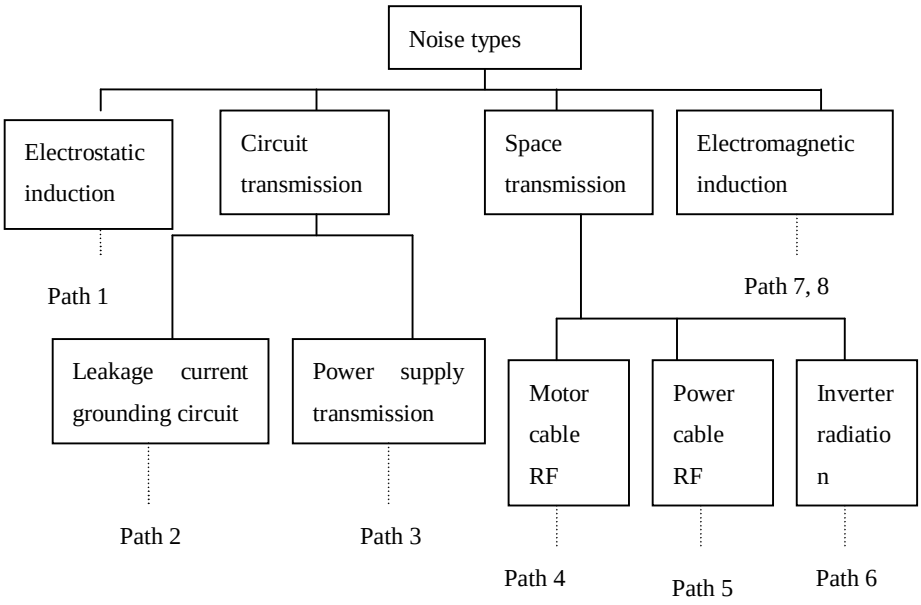
2-6. Mounting guide according with EMC requirement

As the inverter's output wave is PWM, electromagnetic noise will be inevitably generated while it is working.To reduce the inverter's disturbance for the external devices, this chapter introduces the mounting method in the following aspects: control the noise, local wiring, grounding, leak current, usage of power supply filter.

2-6-1. Control the noise

1. Noise type

The noise made by inverter may affect the neaby equipments and the effection is related to inveter's control system, antinoise and anti-jamming ability of the devices, wiring environment, safety distance, grounding method and other factors.The noise contains the following types: electrostatic induction, circuit transmit, space transmit, electro magnetic induction and so on.



2. Essential countermeasure for suppressing noise

Table 2-5 solution for control noise

Noise transmit path	Solution
2	When the external equipment forms a loop with the inverter, the equipment may operate incorrectly caused by leakage current of inverter grounding cable. The problem can be solved if the equipment is not grounded.
3	If the external equipment shares the same AC supply with the inverter, the inverter's noise may be transmitted along its input power supply cables, which may cause interference to other external equipments. Take the

	following actions to solve this problem: Install noise filter at the input side of the inverter, and use an isolation transformer or power filter to prevent the noise from disturbing the external equipment.
4,5,6	(1)The equipment and the signal cables should be as far away as possible from the inverter. The signal cables should be shielded and the shielding layer should be grounded. The signal cables should be located far away from the input/output cables of the inverter. If the signal cables must cross over the power cables, they should be placed at right angle to one another. (2) Install high-frequency noise filter (ferrite common-mode choke) at the input and output of the inverter to prevent the RF interfere of power lines. (3) Motor cables should be placed in a tube thicker than 2mm or buried in a cement slot. Power cables should be placed inside a metal tube and be grounded by shielding layer (Motor cable should use 4-core cable, one of the cores should be grounded near the inverter and another point should be connected to the motor's cover).
1,7,8	Don't put the strong and weak electricity cables in parallel or bundle these cables together. Other devices should also be away from the inverter.The devices wire should be away from the I/O of the inverter. The signal cables and power cables should be shielded cables. Devices with strong electric field and magnetic field should be away and orthogonal from the inverter.

2-6-2. Local wiring and grounding

(1) The cable connected inverter and motor (cables from U, V, W points) should not parallel with power supply calbe (R, S, T or L, N terminal input wire). The distance should be more than 30cm.

(2) Inverter's output cables from U, V, W terminals is recommend to put in metal tube or slot.

(3) Control signal cables should be shield and the shield layer should be connected with inveter's PE terminal, then ground the point near the inverter.

(4) The grounding cable of inverter's PE terminal should be connected to ground directly.It can't connect to other devices' grounding cables.

(5) Don't put the signal cables in parallel with the power cables (R, S, T or L, N with U, V, W) or bundle these cables together, at least 20~60 cm distance shoule be kept (related with power current), If the signal cables and power cables needed to be intersected, they should be vertical to each other, as shown in Fig2-12.

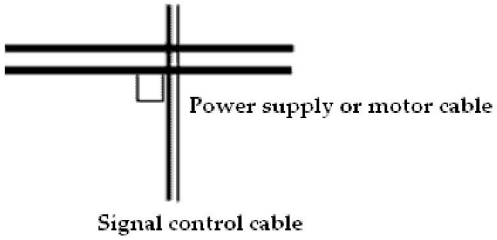


Fig. 2-12 Wiring requirement of system

(6) The weak electricity grounding cable such as control signal and sensors should be separated with strong electricity grounding cable.

(7) Do not connect other devices to inverter's power input terminals (R, S, T or L,N).

3 Operating Instructions

3-1. Run the inverter

3-1-1. Command channel for inverter running

We can control the inverter's START, STOP, JOG and other running actions by three command channels.

1. Operation panel

Control by

,

and

keys on the operation panel (default setting)

2. Control terminals

Use FWD, REV, COM to form 2-wire control, or use one terminal of X1~X6 and FWD, REV to form 3-wire control.

3. Serial port

The operations such as START, STOP can be controlled by other devices which can communicate with the inverter.

You can select the command channels via parameter P0.03 or via multi-function input terminal (P4.00~ P4.07 function 23, 24).

Warning: The user must debug the system after changing the command channel to make sure it can meet the system requirement, otherwise device damage and physical injury will happen.

3-1-2. Frequency setting channel

In common operating mode, there are 8 channels to set the frequency:

0: keyboard analog potentiometer
1: ▲ and ▼ keys on the keyboard
2: Operation panel function code
3: Terminals UP/DOWN
4: Serial port
5: Analog VI
6: Analog CI
7: Pulse terminal（PULSE）
8: Combination

3-1-3. Running state

There are two running state: stopping and running.

Stopping state: After the inverter is switched on and initialized, If no operating command is executed, then the inverter enters stopping state.

Running state： The inverter enters running state after it receive the running command.

3-1-4. Running modes

V5 inverter has 5 kinds of running modes which can be sequenced according to the priority: Jog running→Close loop running→PLC

running→Multi-step speed running→Simple running, as shown in Fig. 3-1.

0：Jog running

When the inverter is in the stopping state, it will running according to jog frequency (refer to P3.06~P3.08 for details) after receiving jog running command (e.g after pressing

key)

1：Close loop

If the close loop running function is enabled (P7.00=1), the inverter will enter the close loop running modes, that is, it will perform PI adjust according to the reference and feedback value (refer to parameters in group P7), PI adjuster output is the essential command of inverter's output frequency. Close loop running can be disabled by multi-function terminal (No.27 function) and the inverter will be in a running mode with lower priority.

2：PLC running

If PLC function is enabled (Unit's place of P8.00 is set to a non-zero value), the inverter will enter PLC running mode and running in the pre-defined running mode (refer to parameter description in group P8). PLC running can be disabled by multi-function terminal (No.29 funcition) and the inverter will select a running mode with low priority.

3：Multi-speed running

Select Multi-frequency 1~7 (P3.26～P3.32) to realize multi-speed running by no-zero combination of multi-function terminal (No.1, 2 and 3 functions)

4：Common running

Common running is actually the open loop running mode.

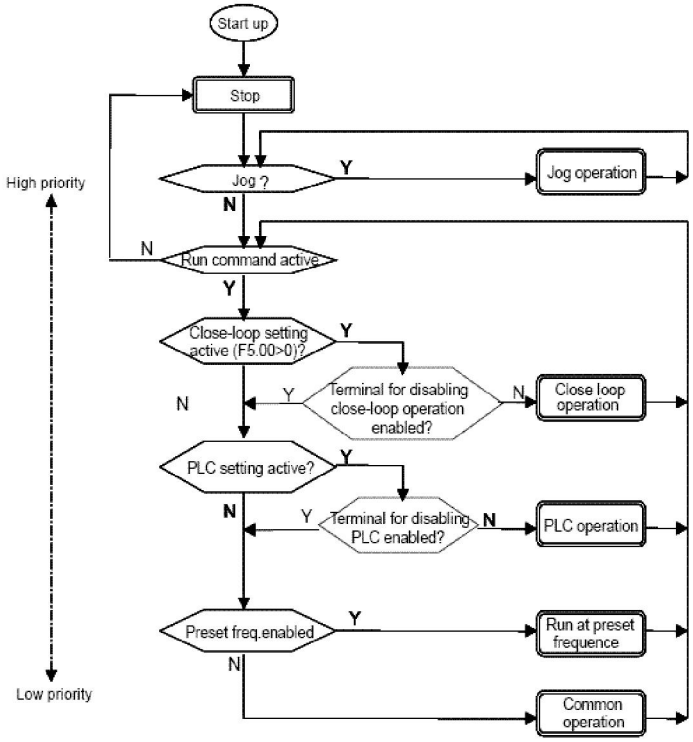


Fig. 3-1 Running state of V5

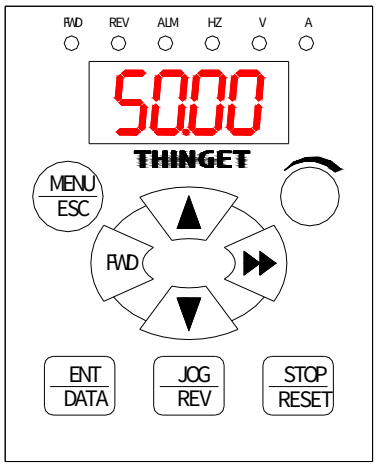
Except “Jog running”, other 4 kinds running modes can be enabled by multi-frequency setting method. Besides, “PLC running”, “multi-speed running”, “common running” can be used as traverse frequency.

3-2. Use the keyboard

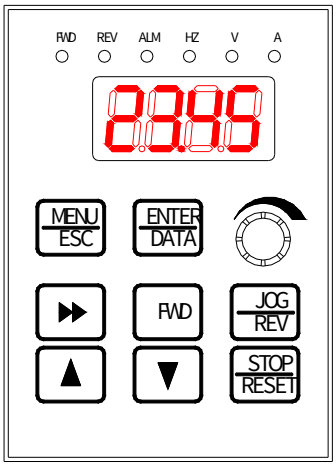
3-2-1. Keyboard layout

Start, speed, stop, brake, running parameter setting and control of the peripheral can be performed by inverter's operation panel and control terminals, operation panel is shown in Fig.3-2.

VB5-OPU-01



V5-OPU-01/02



V5-OPU-03

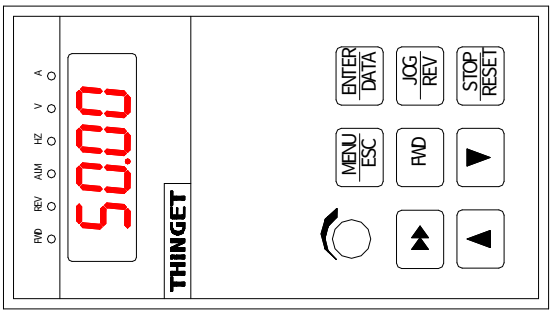
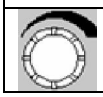


Fig. 3-2 Illustration of operation panel

3-2-2. Keyboard function

There are 8 keys and 1 analog potentiometer on operation panel and the functions are shown in the following table.

Key	Name	Function
FWD	Forward running	In operate panel control mode, press this key to run forward
STOP RESET	Stop/Reset	In operate panel control mode, press this key to stop running or return to normal state when inverter is in error state.
MENU ESC	Program/Exit	Enter or exit programming state
JOG REV	Jog/Reverse run	P3.45=0, jog running P3.45=1, reverse running
▲	Increase	Increase data or function code

	Decrease	Decrease data or function code
	Shift	In editing state, press this key to select the bit to be changed; in other state, press this key to see the monitor parameters.
	Save/switch	In program state, press this key to enter the next menu or saving the parameters.
	Analog potentiometer	When P0.01=0, adjust analog potentiometer to change the inverter's output frequency.

3-2-3. Fucntion description of LED and indicator

The operation panel consists of 4 bits-8 segments LED, 3 unit indicators and 3 state indicators. The three unit indicators have 6 different combinations and each combination corresponds to one type of unit while settting parameters.The relationship between the combination of the indicators and the unit are shown in Fig.3-3.

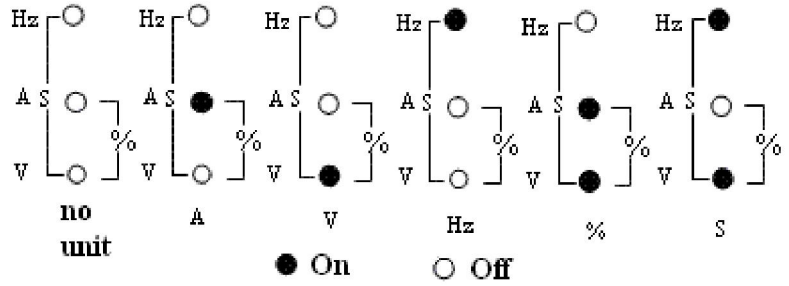


Fig. 3－3 Unit represted by combination of the indicators

3 state indicators locate above the LED display on the operate panel.

From left to right are: forward indicator FWD, reverse indicator REV, alarm indicator ALM. The functions of these indicators are shown in Table3-1

Table 3-1 Functions of status indicators

<table>
<tr><th colspan="3">Item</th><th colspan="2">Function</th></tr>
<tr><td rowspan="4">Display function</td><td colspan="2">LED display</td><td colspan="2">Display inverter’s current status parameters and setting parameters</td></tr>
<tr><td rowspan="3">Status indicators</td><td>FWD</td><td>Forward running indicator, inverter outputs positive phase, the motor will run forward after connecting to the inverter</td><td rowspan="2">If FWD and REV indicators all light on, it means that the inverter are under DC braking status</td></tr>
<tr><td>REV</td><td>Reverse running indicator, inverter outputs negative phase.The motor will run reverse after connecting to the inverter</td></tr>
<tr><td>ALM</td><td colspan="2">This indicator will light on when the inverter has fault.</td></tr>
</table>

3-2-4. Display of the operation panel

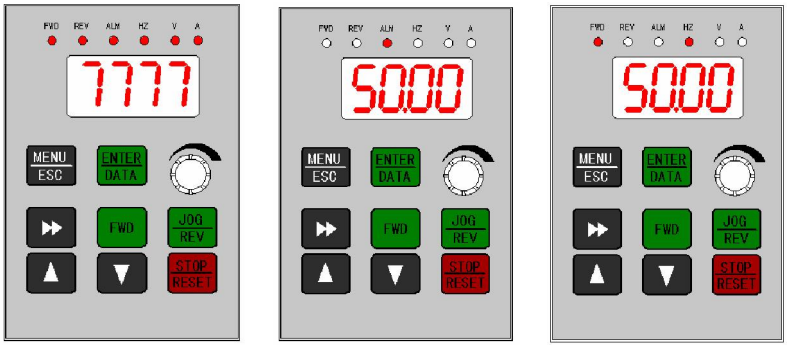
The inverter’s operation panel can display four paraters in stopping,

editing, fault alarming and running.

1. Parameters displayed in stopping status

When the inverter stops operation, operation panel displays monitor parameters in stopping status, the normally content is setting frequency (b-01 monitor parameter). As shown in Fig.3-4,the unit indicator on the top right indicates the unit of this parameter.

Pressing ▶▶ key can display other monitor parameters in stopping status circularly (the first seven monitor parameters in B group are fault displayed value and the other monitor parameters can be defined by function code P3.41 and P3.42, please refer to Chapter 5 for details).Press ENTER DATA in display status can shift to b-01 which can set frequency, otherwise the panel will display the last monitor parameter constantly.



A
Initialize at power on, display dynamic image

B
Stopping state, display stopping information

C
Running state, display running information

运行状态，显示运行状态参数

Fig. 3－4 Display during initialize, STOP and RUN

2. Parameters displayed in running status

When the inverter receive the running command, it starts to enter

running status and operation panel will display running monitor parameters, the default parameter is output frequency (b-00 monitor parameter),as shown in Fig.3-4-B, the unit indicator on the top right indicates the unit of this parameter

Press ▶▶ key can display parameter in running status circularly (defined by function code P3.41 and P3.42).While displaying, press ENTER DATA key to shift to the default parameter b-00，that is output frequency，Otherwise, the operation panel will display the last monitor parameter constantly.

3. Alarm information

When then inverter detects a fault signal, the panel will display fault code, the code will flash to catch your attention as shown in Fig.3-5; Press ▶▶ key to view the relative fault parameters in stopping status, and then press ENTER DATA to shift to fault code display.

If you want to view fault information, press MENU ESC to view P6 parameter in editing status.After you finding out and solve the default, the inverter can be reset by STOP RESET key in operation panel or control terminals or communication command. The fault code will not disappear until the fault is cleared.

Note： For some serious default such as over current, over voltage etc. please do not reset the inverter to rerun before confirming that the default is cleared, otherwise the inverter may be damaged.

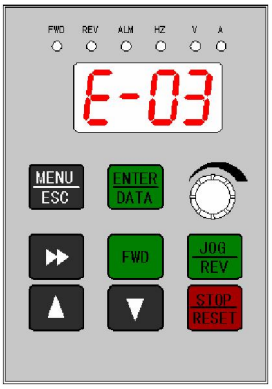


Fig.3—5 Alarming display status

4. Editing status

This status can be entered by pressing MENU ESC key in stopping ,running or fault alarming status(if there is a user's password, you should input correct password, refer to P0.00 and Fig 3-9 for details).This status can be displayed in three level menu, they are: code gruop→code No. → code parameter, you can enter the sub-menu by pressi ENTER DATA .In code parameter status, press ENTER DATA to save parameter and press MENU ESC to exit without saving.

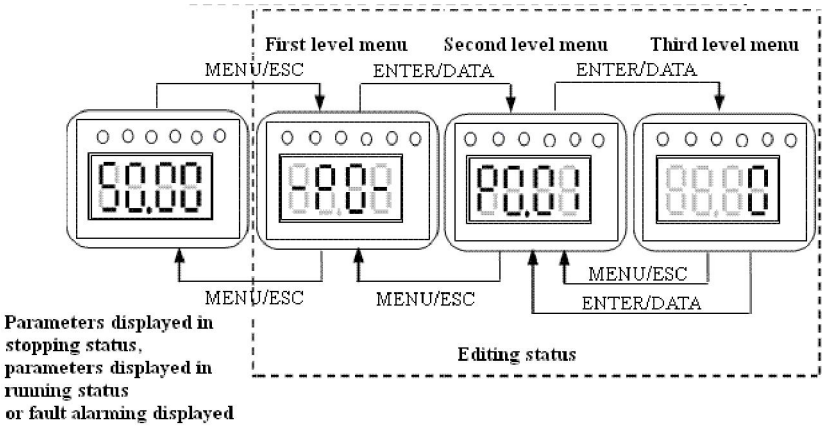


Fig. 3－6 Editing status

3-2-5. Panel operation procedure

The following shows how to do various operation by operation panel.

1. Parameter Display

Press ▶▶ key to display monitor parameters in b group.First display the parameter No, then shift to display parameter value automatically in one second.The shift method is shown below in Fig 4-7

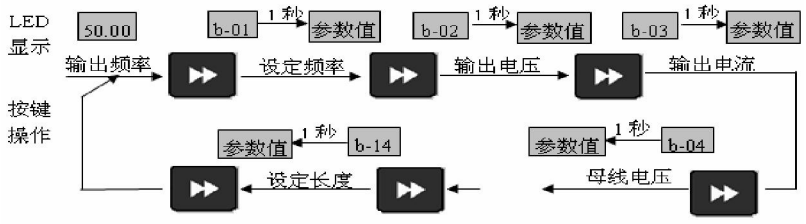


Fig. 3-7 Setting the parameters in running status

1)State parameter can only display seven parameters from b-00 to b-06 with factory setting, you can view other status parameters by changeing P3.41 and P3.42.

(2) When you want to view status monitor parameter, press ENTER DATA can shift to default monitor parameter display status.The default monitor parameter in stopping states is setting frequency and in running states is output frequency.

2. Function parameter

Take the following as an example: reset function parameter P3.065 from 5.00Hz to 8.50Hz.

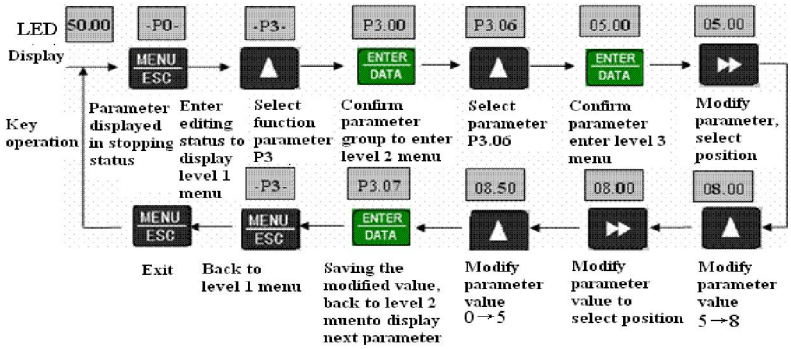


Fig. 3-8 Parameter editing

In three level menu states, the parameter can't be changed if none digit of the parameter is flashing, the possible reasons are:

(1) The setting of this parameter can not be changed, such as the actural detected parameters or recorded parameters.

(2) This parameters can only be changed in stopping state and can not be

changed in running state.

(3) Parameters have been protected. If P 3.01 is set to 1 or 2, the setting of all the parameters can not be changed by wrong operation. If you really want to change the setting, first set P3.01 to 0.

3. Jog

When the inverter in stop state, press JOG key and holde it, the panel will display start output frequency and the frequency will ramp to 5Hz, then releasing the JOG key, the frequency will drop to 0Hz and the inverter will stop.

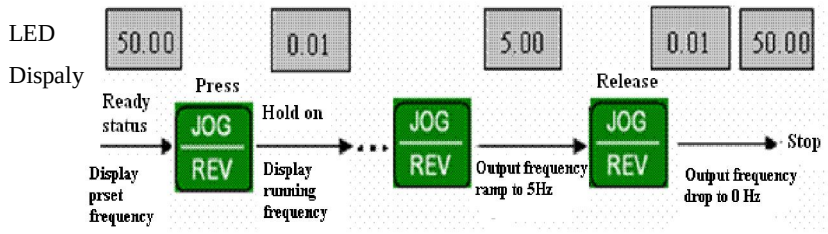


Fig. 3-9 Jog Operation

4. Setting user's password

Setting PF.01 as "2345" and let it as user's password. The bold digit indicates flashing digit.

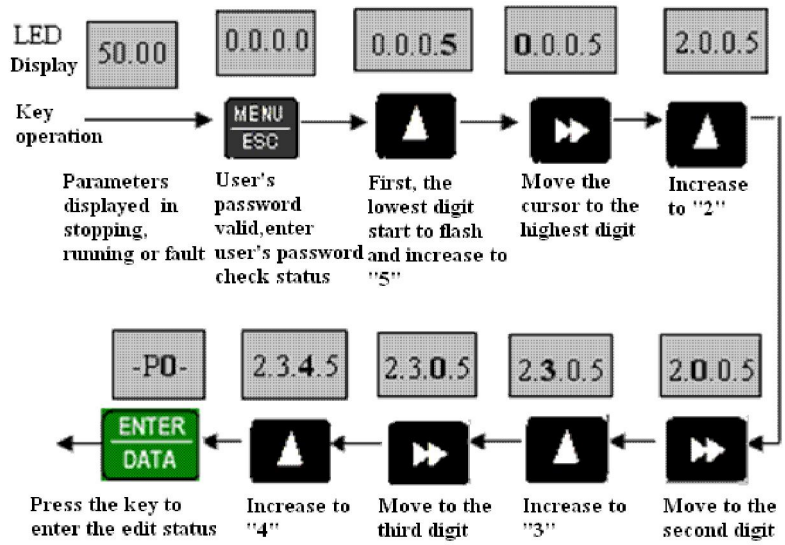


Fig. 3-10 Input user's password

5. Inquiry fault parameters:

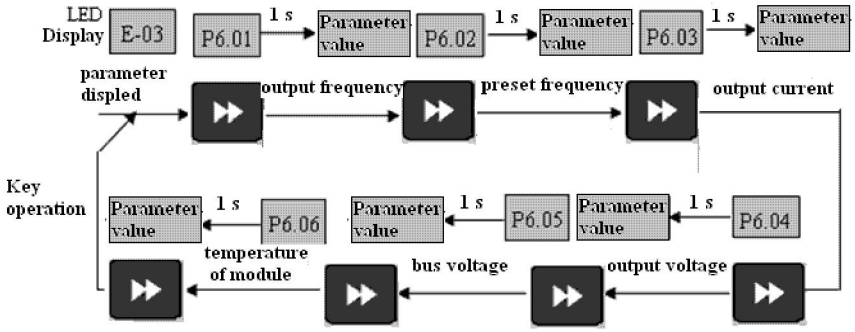


Fig. 3-11 Inquiry operation in fault status

Note：

(1) You can press key to inquire P6 function parameter group in the status of parameters displayed in fault, the range of the parameters is P6.01～P6.06, when you press key, parameter No. will firstly displayed and the parameter value will be displayed automatically in one second.

(2)While inquiring, You can press key to back to fault parameter displayed status.

6. Setting freuqnecy via and

Suppose that the parameters at stop is displaying, P0.01=1, the operation mode is shown below:

(1)Frequency adjustment adopt integral mode;

(2)When pressing , the digital increases from unit' place of LED, then it carries from unit's place to ten's place, the digital of ten's place starts to increase, as the same, when it carries from ten's place to hundred's place, the digital of hundred's place starts to increase, so does the digital of thousand's place. If you release and press it again, the digital will restart to increase from the unit's place of LED.

(3)When pressing , the digital decreases from unit's place of LED, then it borrow from ten's place , the digital of ten's place starts to decrease. So does the digital in hundred'place and thousand's place.If you re key and press it again, it will restart to descrease from the unit's place of LED.

7. Lock the panel

If the panel is unlocked, press key for five seconds can lock the

panel.

8. Unlock the panel

If the panel is locked, press MENU ESC key for five seconds can unlock the panel.

3-3. Start-up

3-3-1. Checking before starting up

Please wire the inverter according to “Wiring”in this manual.

3-3-2. Start up the inverter for the first time

After checking the wiring and AC power, switch on the AC power supply to electrify the inverter.The inverter’s panel will display dynamic screen and then the contactor closes. When the LED displays preset frequency, the initialization of this inverter is completed.The procedure is shown as Fig. 3-12:

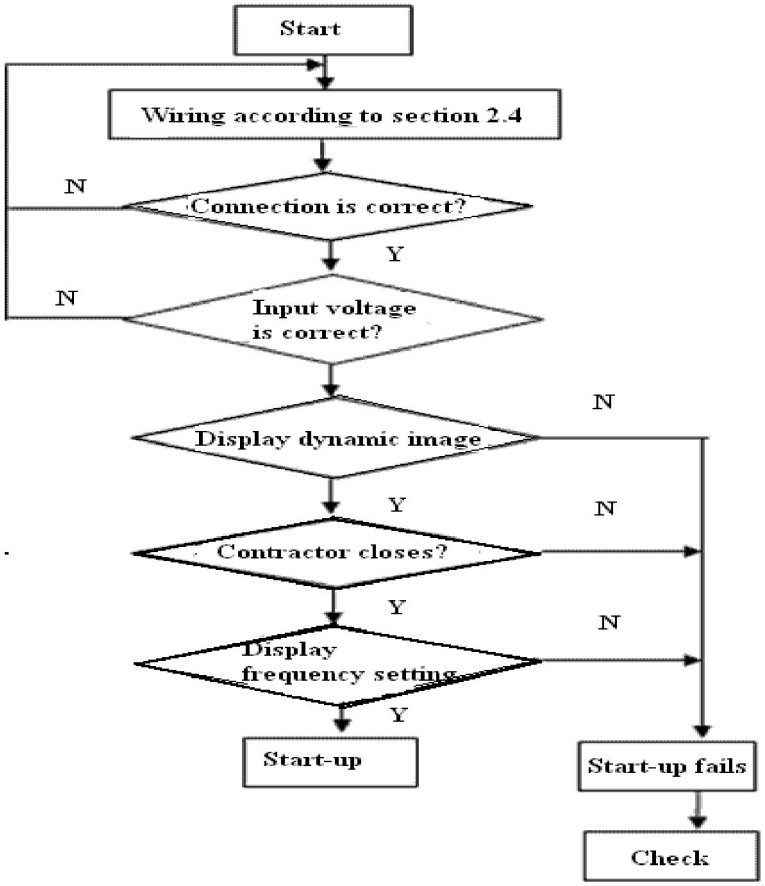


Fig. 3-12 Procedures of starting the driver for the first time

4 Function Parameters

4-1. Function parameter table

“◯”: Parameters can be changed while running
“×”: Parameters can not be changed while running
“*”: Parameters can only be read, user can not changed

1. Basic running parameters (Group P0)

Group P0：Basic running parameters					
Parameter	**Name**	**Setting Range**	**Minmum unit**	**Factory setting**	**Change**
P0.00	Control mode selection	0：V/F control 1: open-loop vector control	1	0	×
P0.01	Frequency setting mode	0：Analog potentiometer in the panel 1：Increase/Decrease key 2：digit setting 1，via keys on the panel 3：digit setting 2，via terminal UP/DOWN 4：digit setting 3，via serial port 5：VI analog input（VI-GND）	1	0	◯

		6：CI analog input（CI-GND） 7 ： Pulse input（PULSE） 8 ： Combined setting mode（refer to P3.00）			
P0.02	Running frequency in digit mode	P0.19 High frequency limit～P0.20 low frequency limit	0.01HZ	50.00HZ	○
P0.03	Running command selection	0 ： Running frequency via operation panel control 1：Teminal control 2 ： serial port control	1	0	○
P0.04	Running direction setting	Unit’s place： 0： jog forward via panel 1：jog reverse via panel Ten’s place： 0 ： permit reverse 1 ： prohibit reverse	1	00	○
P0.05	Run forward/reverse dead time	0.0～120.0s	0.1s	0.1s	○

P0.06	Highest ouput frequency	50.00Hz ～ 500.00Hz	0.01Hz	50.00Hz	×
P0.07	Basic running frequency	1.00Hz ～ 500.00Hz	0.01Hz	50.00Hz	×
P0.08	Highest output voltage	1～480V	1V	Inverter rated voltage	×
P0.09	Torque boost	0.0%～30.0%	0.1%	2.0%	○
P0.10	Cut-off frequency for torque boost	0.00Hz ～ basic running frequencyP0.07	0.00	25.00Hz	○
P0.11	Torque boost mode	0：manual 1：automatical	1	0	○
P0.12	Carrier frequency	1.0K～14.0K	0.1K	8.0K	×
P0.13	Acc/Dec direction selection	0：linear Acc/Dec 1：S curve Acc/Dec	1	0	×
P0.14	Low speed time of S ramp	10.0 % ～ 50.0 %（Acc/Dec time） P0.14＋P0.15＜90 %	0.1%	20.0%	○
P0.15	Linear time of S ramp	10.0 % ～ 80.0 %（Acc/Dec time） P0.14＋P0.15＜90 %	0.1%	60.0%	○
P0.16	Acc/Dec time unit	0：second 1：minute	0	0	×

P0.17	Acc time 1	0.1～6000.0	0.1	10.0	○
P0.18	Dec time 1	0.1～6000.0	0.1	10.0	○
P0.19	High frequency limit	Low frequency limit ～ highest output frequency P0.06	0.01Hz	50.00Hz	×
P0.20	Low frequency limit	0.00Hz ～ high frequency limit	0.01Hz	0.00Hz	×
P0.21	Running mode of low frequency limit	0：running at low frequency limit 1：stop	1	0	×
P0.22	V/F curve setting	0：constant torque curve 1：torque-reducing curve 1（1.2 order） 2：torque-reducing curve 2（1.7 order） 3：torque-reducing curve 3（2.0 order） 4：multi-segment V/F curve	1	0	×
P0.23	V/F frequency value P1	0.00～P0.25	0.01Hz	0.00Hz	×
P0.24	V/F voltage value V1	0～ P0.26	0.1%	0.0%	×
P0.25	V/F frequency	P0.23 ～ P0.27	0.01Hz	0.00Hz	×

	value P2				
P0.26	V/F voltage value V2	P0.24 ～ P0.28	0.1%	0.0%	×
P0.27	V/F frequency value P3	P0.25 ～ P0.07 basic running frequency	0.01Hz	0.00Hz	×
P0.28	V/F voltage value V3	P0.26 ～ 100.0%	0.1%	0.0%	×

2. Reference frequency parameter (Group P1)

Group P1：reference frequency parameter					
Parameter	**Name**	**Setting range**	**Minmum unit**	**Factory setting**	**Change**
P1.00	Time constant of analog filter	0.01～30.00s	0.01s	0.20s	○
P1.01	VI Gain of reference frequency selsector	0.01～9.99	0.01	1.00	○
P1.02	min reference of VI	0.00～P1.04	0.01V	0.00V	○
P1.03	Frequency corresponding to min reference of VI	0.00 ～ high frequency limit	0.01Hz	0.00Hz	○

P1.04	Max reference of VI	P1.04～10.00V	0.01V	10.00V	○
P1.05	Frequency corresponding to max reference of VI	0.00 ～ high frequency limit	0.01Hz	50.00Hz	○
P1.06	Gain of reference frequency selector of CI	0.01～ 9.99	0.01	1.00	○
P1.07	Min reference of CI	0.00～ P1.09	0.01V	0.00V	○
P1.08	Frequency corresponding to min reference of CI	0.00 ～ high frequency limit	0.01Hz	0.00Hz	○
P1.09	Max reference of CI	P1.07 ～10.00V	0.01V	10.00V	○
P1.10	Frequency corresponding to max reference of CI	0.00 ～ high frequency limit	0.01Hz	50.00Hz	○

P1.11	Max input pulse frequency of PULSE	0.1～20.0K	0.1K	10.0K	○
P1.12	Min reference of PULSE	0.0～P1.14 (Max reference of PULSE)	0.1K	0.1K	○
P1.13	Frequency corresponding to min reference of PULSE	0.00 ～ high frequency limit	0.01Hz	0.00Hz	○
P1.14	Max reference of PULSE	P1.12（Min reference of PULSE）～P1.11（Max input frequency）	0.1K	10.0K	○
P1.15	Frequency corresponding to max reference of PULSE	0.00 ～ high frequency limit	0.01Hz	50.00Hz	○
P1.16	Input mode of CI	0：4～20mA 1：0～10V	-	0	○

3. Starting and Braking Prameters (Group P2)

Group P2：Starting and Braking Prameters					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
P2.00	Starting mode	0：Start from the starting frequency 1： Brake first and then start from the starting frequency 2：Start on the fly	1	0	×
P2.01	Starting frequency	0.20～20.00Hz	0.01Hz	0.50Hz	○
P2.02	Holding time of starting frequency	0.0～30.0s	0.1s	0.0s	○
P2.03	DC injection braking current at start	0.0～80.0%	0.1%	0%	○
P2.04	DC injection braking time at start	0.0～60.0s	0.1s	0.0s	○
P2.05	Stopping mode	0：Dec-to-stop 1：Coast-to-stop 2： Dec-to-stop +DC braking	1	0	×

P2.06	DC injection braking initial frequency at stop	0.0～15.00Hz	0.0Hz	3.00Hz	○
P2.07	DC injection braking waiting time at stop	0.0～60.0s	0.1s	0.0s	○
P2.08	DC injection braking current at stop	0.0～80.0%	0.1%	0.0%	○

4. Auxiliary running parameters (Group P3)

Group P3：Auxiliary running parameters					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
P3.00	Combination of frequency input	0： VI+CI 1： VI−CI 2 ： External pulse reference ＋ VI ＋ Increase/Decrease key reference 3 ： External pulse reference － VI － Increase/Decrease key reference 4 ： External pulse reference＋CI	1	0	×

		5 ： External pulse reference－CI 6 ： RS485 ＋ VI＋ Increase/Decrease key reference 7 ： RS485 － VI － Increase/Decrease Key reference 8 ： RS485 ＋ CI ＋ Increase/Decrease key reference 9 ： RS485 － CI － Increase/Decrease key reference 10 ： RS485 ＋ CI ＋ External pulse reference 11 ： RS485 － CI － External pulse reference 12 ： RS485 ＋ VI ＋ External pulse reference 13 ： RS485 － VI － External pulse reference 14 ： VI ＋ CI ＋ Increase/Decrease			

		key reference + Digital setting 15 ： VI + CI − Increase/Decrease key reference + Digital setting 16：MAX（VI，CI） 17：MIN（VI，CI） 18：MAX（VI，CI，PULSE） 19：MIN（VI，CI，PULSE） 20：VI，CI none-zero is valid，VI priority			
P3.01	Parameter initialization locking up	Unit's place： 0: All parameters are allowed modifying 1: Only P3.01 can be modified 2:Only P0.02 and P3.01 can be modified Ten's place： 0：disabled 1：Restore to factory setting 2：Clear fault record	1	00	×
P3.02	Parameter	0:disabled	1	0	×

	copy	1:parameter upload 2:parameter download Note:Function is still in developing			
P3.03	Auto energy-saving function	0：disabled 1：Enabled	1	0	×
P3.04	AVR function	0：disabled 1：enable all the time 2： Disabled in Dec process	1	0	×
P3.05	Gain of slip compensation	0～150%	1%	0%	×
P3.06	Jog operating frequency	0.10～50.00Hz	0.01Hz	5.00Hz	○
P3.07	Acc time of jog operation	0.1～60.0s	0.1s	5.0s	○
P3.08	Dec time of jog operation	0.1～60.0s	0.1s	5.0s	○
P3.09	Communication config	LED unit's place：baud rate selection 0：1200BPS 1：2400BPS 2：4800BPS 3：9600BPS 4：19200BPS	1	054	×

		5：38400BPS LED ten's place：data format 0：1－7－2 foramt，no parity check 1：1－7－1 format，Odd 2：1－7－1 format，Even 3：1－8－2 format，None 4：1－8－1 format，Odd 5：1－8－1 format，Even 6：1－8－1 format，None (When use Modbus-RTU communication mode ，please select data mode 3～6。) LED hundred's place: undefined			
P3.10	Local address	0～248 0：broadcast address 248：inverter as the	1	1	×

		host address			
P3.11	Delay for responding to control PLC	0.0～1000.0s 0.0 ： Detection disabled	0.1s	0.0s	×
P3.12	Delay for responding to control PLC	0～1000ms	1	5ms	×
P3.13	Reference proportion of communicatio n frequency	0.01～1.00	0.01	1.00	×
P3.14	Acc time 2	0.1～6000.0	0.1	10.0	○
P3.15	Dec time 2	0.1～6000.0	0.1	10.0	○
P3.16	Acc time 3	0.1～6000.0	0.1	10.0	○
P3.17	Dec time 3	0.1～6000.0	0.1	10.0	○
P3.18	Acc time 4	0.1～6000.0	0.1	10.0	○
P3.19	Dec time 4	0.1～6000.0	0.1	10.0	○
P3.20	Acc time 5	0.1～6000.0	0.1	10.0	○
P3.21	Dec time 5	0.1～6000.0	0.1	10.0	○
P3.22	Acc time 6	0.1～6000.0	0.1	10.0	○
P3.23	Dec time 6	0.1～6000.0	0.1	10.0	○
P3.24	Acc time 7	0.1～6000.0	0.1	10.0	○
P3.25	Dec time 7	0.1～6000.0	0.1	10.0	○
P3.26	Multi-frequen cy 1	Lower limit frequency～upper limit of frequency	0.01Hz	5.00Hz	○
P3.27	Multi-frequen	Lower limit	0.01Hz	10.00Hz	○

	cy 2	frequency～upper limit of frequency			
P3.28	Multi-frequency 3	Lower limit frequency～upper limit of frequency	0.01Hz	20.00Hz	○
P3.29	Multi-frequency 4	Lower limit frequency～upper limit of frequency	0.01Hz	30.00Hz	○
P3.30	Multi-frequency 5	Lower limit frequency～upper limit of frequency	0.01Hz	40.00Hz	○
P3.31	Multi-frequency 6	Lower limit frequency～upper limit of frequency	0.01Hz	45.00Hz	○
P3.32	Multi-frequency 7	Lower limit frequency～upper limit of frequency	0.01Hz	50.00Hz	○
P3.33	Jump frequency 1	0.00～500.00Hz	0.01Hz	0.00Hz	×
P3.34	Range of jump frequency 1	0.00～30.00Hz	0.01Hz	0.00Hz	×
P3.35	Jump frequency 2	0.00～500.00Hz	0.01Hz	0.00Hz	×
P3.36	Range of jump frequency 2	0.00～30.00Hz	0.01Hz	0.00Hz	×

P3.37	Jump frequency 3	0.00～500.00Hz	0.01Hz	0.00Hz	×
P3.38	Range of jump frequency 3	0.00～30.00Hz	0.01Hz	0.00Hz	×
P3.39	Set running time	0～65.535K hour	0.001K	0.000K	○
P3.40	Accumulate running time	0～65.535K hour	0.001K	0.000K	*
P3.41	Display parameters selection 1	0000～FFFF Unit's place：b-09～b－12 Ten's place：b-13～b－16 Hundred's place：b-17～b－20 Thousand's place：b-21～b－24	1	0000	○
P3.42	Display parameters selection 2	0000～FFFF Unit's place：b-25～b－28 Ten's place：b-29～b-32 Hundred's place：b-33～b-36 Thousand's place：b-37～b-40	1	0000	○

P3.43	Display parameters selection 3	0000～4040 Ten's place, unit's pladce ：stop displayed parameter selection Thousand's place, hundred's place ：run displayed parameter selection	1	0001	○
P3.44	Display coefficient without unit	0.1～60.0	0.1	1.0	○
P3.45	JOG/REV shift control mode	0：select JOG to start jog 1：select REV start reverse	1	0	×

5. Function parameters of terminal (Group P4)

Group P4：Function Parameters of Teriminal					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
P4.00	Function selection of input terminal X1	0 ： Control terminal free 1： Multi-step speed control terminal 1	1	1	×

		2 ： Multi-step speed control terminal 2 3 ： Multi-step speed control terminal 3 4 ： Exteral terminal for forward jog operation 5 ： Exteral terminal for reverse jog operation 6 ： Acc/Dec time terminal 1 7 ： Acc/Dec time terminal 2 8 ： Acc/Dec time terminal 3 9 ： 3-wire operation control 10 ： Coast-to-stop （FRS） 11 ： External stop command			

		12 ： DC injection braking command DB 13 ： Inverter running prohibit 14：Frequency ramp up（UP） 15：Frequency ramp down（DOWN） 16 ： Acc/Dec prohibit 17 :Reset signal（clear fault） 18 ： External fault signal normally open input 19：Frequency selector 1 20：Frequency selector 2 21：Frequency selector 3 22 ： Terminal control mode is			

		forcibly enabled 23 ： Control mode selector 1 24 ： Control mode selector 2 25 ： Start traverse operation 26：Reset the traverse operation status 27：Close-loop disabled 28：Pause the PLC operation 29 ： PLC disabled 30：Reset PLC stopping status 31： Frequency reference is input via CI 32： Counter’s trig signal input 33： Counter’s zero-cleaning signal input			

		34 ： External interrupt input 35 ： Pulse frequency input （ only valid for X6） 36: Actual length clearing input			
P4.01	Function selection of input terminal X2	As above	1	2	×
P4.02	Function selection of input terminal X3	As above	1	3	×
P4.03	Function selection of input terminal X4	As above	1	10	×
P4.04	Function selection of input terminal X5	As above	1	17	×
P4.05	Function selection of	As above	1	18	×

	input terminal X6				
P4.06	Function selection of input terminal X7 FWD	As above	1	0	×
P4.07	Function selection of input terminal X8 REV	As above	1	0	×
P4.08	FWD/REV Operation mode selection	0 ： 2-wire control mode 1 1 ： 2-wire control mode 2 2 ： 3-wire control mode 1 3 ： 3-wire control mode 2	1	0	×
P4.09	UP/DN speed rate	0.01 － 99.99Hz/s	0.01	1.00Hz/s	○
P4.10	Bi-direction open-collector output terminal OC	0 ： Inverter running（RUN） 1 ： Frequency arriving signal（FAR） 2 ： Frequency detection	1	0	×

		threshold（FDT1） 3 ： Frequency detection threshold（FDT2） 4 ： Overload pre-alarm（OL） 5 ： Inverter under voltage locking（LU） 6 ： External fault stop（EXT） 7 ： Output frequency arrive upper limit of（FH） 8 ： Output frequency arrive lower limit（FL） 9：Inverter zero speed running 10 :Simple PLC Pause running finished 11 ： PLC is			

		finished after one cycle running 12:Specified counting value arriving 13 ： Mid counting value arriving 14 ： Inverter Ready running finished（RDY） 15 ： Inverter fault 16 ： Start frenquence running time 17： Start DC injection braking time 18 ： Stop braking time 19： High and lower limits of traverse operating frequency 20 ： set			

		running time arrive			
P4.11	Relay output selector	As above	1	15	×
P4.12	Detecting range of frequency arrive （FAR）	0.00～50.00Hz	0.01Hz	5.00Hz	○
P4.13	FDT1 （frequency） level	0.00 ～ upper limit of of frequency	0.01Hz	10.00Hz	○
P4.14	FDT1 lag	0.00～50.00Hz	0.01Hz	1.00Hz	○
P4.15	FDT2 （frequency） level	0.00 ～ upper limit of of frequency	0.01Hz	10.00Hz	○
P4.16	FDT2 lag	0.00～50.00Hz	0.01Hz	1.00Hz	○
P4.17	Analog output （AO）	0 ： Output frequency （0～） 1 ： Output current （0～2 times of rated current） 2 ： Output voltage（0～1.2 inverter’s rated voltage）	1	0	○

		3：Bus voltage（0～800V） 4 ： PID reference 5 ： PID feedback 6 :VI（0～10V） 7 ： CI(0 ～ 10V/4～20mA)			
P4.18	Analog output（AO） gain setup	0.50～2.00	0.01	1.00	○
P4.19	AO output mode	0：4～20mA 1：0～10V	-	1	○
P4.20	DO output terminal	0 ： Output frequency（0～upper limit of of frequency） 1 ： Output current（0～2 times motor rated current） 2 ： Output voltage（0～1.2 inverter’s rated voltage） 3：Bus voltage（0～800V）	1	0	○

		4 ： PID reference 5 ： PID feedback 6 :VI（0～10V） 7 ： CI(0 ～ 10V/4～20mA)			
P4.21	DO max pulse oupt frequency	0.1K ～ 20.0K（ Max: 20KHz）	0.1KHz	10.0KHz	○
P4.22	preset counting value arriving	P4.23～9999	1	0	○
P4.23	Mid counting value arriving	0～P4.22	1	0	○
P4.24	Overload pre-alarm detection level	20%～200%	1	130%	○
P4.25	Delay time of over load pre-alarm	0.0～20.0s	0.1s	5.0s	○

6. Protective function parameters (Group P5)

Group P5：Protective function parameters					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**

P5.00	Motor overload protection mode selection	0 ： Inverter locking output 1：Disabled	1	0	×
P5.01	Motor’s overload protection coefficient	20～120%	1	100%	×
P5.02	Protection of over load at stall	0：Disabled 1：Enabled	1	1	×
P5.03	Over voltage point at stall	380V：120～150% 220V：110～130%	1%	140% 120%	○
P5.04	Auto current limiting threshold	110%～200%	1%	150%	×
P5.05	Frequeny decrease rate when current limiting	0.00～99.99Hz/s	0.01Hz/s	10.00Hz/s	○
P5.06	Auto current limiting selection	0：Disabled in constant speed 1： Enabled in constant speed Note：Enabled at	1	1	×

		Acc/Dec			
P5.07	setting of the restart after power off	0：Disabled 1：Enabled	1	0	×
P5.08	Holding time of restart after power off	0.0～10.0s	0.1s	0.5s	×
P5.09	Auto reset times of fault	0～10 0：No auto reset function（Note：overload and overheat have no recovery function）	1	0	×
P5.10	Auto reset interval of fault	0.5～20.0s	0.1s	5.0s	×

7. Fault recording parameter (Group P6)

Group P6：Fault recording parameter					
Parameter	**Name**	**Description**	**Minmun unit**	**Factory setting**	**Change**
P6.00	Previous fault record	Previous fault record	1	0	*
P6.01	Output frequency of	Output frequency of previous fault	0.01Hz	0	*

	previous fault	record			
P6.02	Setting frequency of previous fault	Setting frequency of previous fault record	0.01Hz	0	*
P6.03	Output current of previous fault	Output current of previous fault	0.1A	0	*
P6.04	Output voltage of previous fault	Output voltage of previous fault	1V	0	*
P6.05	DC injectiong bus voltage of previous fault	DC injectiong bus voltage of previous fault	1V	0	*
P6.06	Module temperature of previous fault	Module temperature of previous fault	10C	0	*
P6.07	2 latest fault record	2 latest fault record	1	0	*
P6.08	3 latest fault record	3 latest fault record	1	0	*
P6.09	4 latest fault record	4 latest fault record	1	0	*
P6.10	5 latest fault record	5 latest fault record	1	0	*
P6.11	6 latest fault record	6 latest fault record	1	0	*

8. Close-loop control parameters (Group P7)

Group P7：Close-loop control parameters					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
P7.00	Close-loop function selection	0：Disabled 1：Enabled	1	0	×
P7.01	Reference channel selection	0：Digit input 1：VI (0~10V) 2：Analog reference by CI	1	1	○
P7.02	Feedback channel selection	0：VI (0~10V) 1：Analog reference by CI 2：VI+CI 3：VI-CI 4：Min｛VI，CI｝ 5：Max｛VI，CI｝	1	1	○
P7.03	Reference filter	0.01～50.00s	0.01s	0.50s	○
P7.04	Feedback filter	0.01～50.00s	0.01s	0.50s	○
P7.05	Set reference in digital mode	0.00～10.00V	0.01V	0.00V	○

P7.06	Min reference	0.0 ～ Max reference P7.08	0.1%	0.0%	○
P7.07	Feedback value corresponding to min reference	0.0～100.0%	0.1%	0.0%	○
P7.08	Max reference	Min reference P7.06 ～ 100.0 %	0.1%	100.0%	○
P7.09	Feedback value corresponding to max reference	0.0～100.0%	0.1%	100.0%	○
P7.10	Proportional KP	0.000～9.999	0.001	0.050	○
P7.11	Integral KI	0.001～9.999	0.001	0.050	○
P7.12	Sampling cycle T	0.01～10.00S	0.01	1.00	○
P7.13	Limits of deviation	0.0～20.0%	1%	2.0%	○
P7.14	Close loop adjustment characteristic	0:Forward 1:Reverse Note: relationship between reference temperature and speed	1	0	×

P7.15	Integral adjustment selection	0：Stop integral adjustment selection when the frequency reaches upper limit or lower limits 1：Continue the integral adjustment selection when the frequency reaches high limit or lower limits	1	0	×
P7.16	Close loop preset frequency	0～upper limit of of frequency	0.01Hz	0.00Hz	○
P7.17	Holding time of close loop	0.0～250.0s	0.1s	0.1s	×
P7.18	Threhold of zero-frequency operation	0.00 ～ 500.00Hz	0.01Hz	0.01Hz	×
P7.19	Hysteresis of zero-frequency operation	0.00 ～ 500.00Hz	0.01Hz	0.01Hz	×

9. Simple PLC operation parameters (Group P8)

Group P8：Simple PLC operation parameters					
Parameters	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
P8.00	Simple PLC operation mode selection	0000～1113 Unit's place: mode selection 0：Disabled 1：Stop after single cycle of operation 2：Holding at the final value after single cycle of operation 3：Operate continuously Ten's place: PLC restarting mode after stopping 0：Run again from stage 1 1： Continue to run from the stopping stage Hundred's place： Save at power off 0：Not saving 1： Save the time	1	0000	×

		and frequency at power off Thousand's place :Selecting the unit of time 0:second 1:minute			
P8.01	Stage 1 setup	000～621 Unit's place of LED ： frequency setup 0：Multi i (i=1～7) 1: Frequency is decide by P0.01 Ten's place of LED：Operating direction selection 0：Run forward 1：Run reverse 2 ： Decided by operating instructions Hundred's place of LED：Acc/Dec time selection 0：Acc/Dec time 1 1：Acc/Dec time 2 2：Acc/Dec time 3	1	000	○

		3：Acc/Dec time 4 4：Acc/Dec time 5 5：Acc/Dec time 6 6：Acc/Dec time 7			
P8.02	Operating time in stage 1	0.1～6000.0	0.1	10.0	○
P8.03	Stage 2 setup	000～621	1	000	○
P8.04	Operating time in stage 2	0.1～6000.0	0.1	10.0	○
P8.05	Stage 3 setup	000～621	1	000	○
P8.06	Operating time in stage 3	0.1～6000.0	0.1	10.0	○
P8.07	Stage 4 setup	000～621	1	000	○
P8.08	Operating time in stage 4	0.1～6000.0	0.1	10.0	○
P8.09	Stage 5 setup	000～621	1	000	○
P8.10	Operating time in stage 5	0.1～6000.0	0.1	10.0	○

P8.11	Stage 6 setup	000～621	1	000	○
P8.12	Operating time in stage 6	0.1～6000.0	0.1	10.0	○
P8.13	Stage 7 setup	000～621	1	000	○
P8.14	Operating time in stage 7	0.1～6000.0	0.1	10.0	○

10. Traverse and measure function parameters (Group 9)

Group P9：Traverse and measure function parameters					
Parameters	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
P9.00	Traverse function selection	0：Disabled 1：Enabled	1	0	×
P9.01	Traverse operation control mode	00～11 Unit's place of LED：Start mode 0：Auto mode 1：Manual mode Ten's place of LED：Amplitude control	1	00	×

		0 ： Variable amplitude 1 ： Fixed amplitude			
P9.02	Pre-traverse frequecncy	0.00～500.00Hz	0.01Hz	0.00Hz	○
P9.03	Waiting time before pre-traverse frequency	0.0～3600.0s	0.1s	0.0s	○
P9.04	Traverse operating amplitude	0.0～50.0%	0.1%	0.0%	○
P9.05	Jitter frequency	0.0～50.0%（with reference to P9.04）	0.1%	0.0%	○
P9.06	Traverse operating cycle	0.1～999.9s	0.1s	10.0s	○
P9.07	Rising time of trangle wave	0.0～98.0%（with ）	0.1%	50.0%	○
P9.08	Reference length	0.000 ～ 65.535(km)	0.001km	0.000km	○
P9.09	Actual length	0.0～65.535km（ Saving at power off ）	0.001km	0.000km	○

P9.10	Times of length	0.001～30.000	0.001	1.000	○
P9.11	correction coefficient of length	0.001～1.000	0.001	1.000	○
P9.12	Perimeter of shaft	0.01～100.00cm	0.01cm	10.00cm	○
P9.13	Number of pulses per revolution	1～9999	1	1	○

11.Vector control parameters （Group PA）

Group PA：Vector Control Parameters					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
PA.00	Motor auto-tune	0：No tune 1：auto tune	1	0	×
PA.01	Rated voltage of motor	0～400V	1	Dependent on inverter’s model	×
PA.02	Rated current of motor	0.01 ～ 500.00A	0.01A	Dependent on	×

				inverter's model	
PA.03	Rated frequency of motor	1～99Hz	1Hz	Dependent on inverter's model	×
PA.04	Rated rotated speed of motor	1～9999 r/min	1r/min	Dependent on inverter's model	×
PA.05	Polarity of motor	2～48	1	Dependent on inverter's model	×
PA.06	Stator inductance of motor	0.1 ～ 5000.0mH	0.1mH	Dependent on inverter's model	×
PA.07	Rotor inductance of motor	0.1 ～ 5000.0mH	0.1mH	Dependent on inverter's model	×
PA.08	Exciting induction of motor	0.1 ～ 5000.0mH	0.1mH	Dependent on inverter's model	×
PA.09	Stator	0.001～50.000	0.001Ω	Dependent	×

	resistance of motor	Ω		on inverter's model	
PA.10	Rotor resistance of motor	0.001～50.000 Ω	0.001Ω	Dependent on inverter's model	×
PA.11	Over current protection coefficient of torque	0～15	1	15	×
PA.12	Percentage adjustment coefficient of speed deviation	50～120	1	85	×
PA.13	Integral adjustment coefficient of speed deviation	100～500	1	360	×
PA.14	Vector torque boost	100～150	1	80	×
PA.15	Reversed	0	0	0	×
PA.16	Reversed	1～5	1	4	×
PA.17	Reversed (excitation)	100～150	1	100	×

PA.18	Reversed	150	1	150	×
PA.19	Reversed	0～2	1	0	

12.Specail Application function parameters (Group PB)

Group PB：Specail Application function parameters					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
PB.00	Jog frequency source	0～4 0：P3.06 1 ： Panel potentiometer 2：P0.02 3：VI 4：CI	0	0	○
PB.01	selection of forward/ reverse dead time	0、1 0 ： Dead time is enabled (Min 0.1S) 1：dead time can be set to 0 （ P0.05=0.0S 、 P0.20 ≥ 0.5Hz is needed）	1	0	○
PB.02	Inverter type select	0: G type(normal) 1: P type(wind machine,water pump, power increases 1 level)	1	0	×

		Note: set as 1, P0.22 must set to 3.			
PB.03	Short the run point before power on, set the run mode	0: after inverter is power on, run immediately 1: after inverter is power on, cut off the point and connect again to run	1	1	×

13. Factory setting (Group PF)

Group PP：Factory Setting					
Parameter	**Name**	**Range**	**Minmum unit**	**Factory setting**	**Change**
PF.00	Default password	-	-	-	*
PF.01	User's password	0：With no password protection 0001 － 9999 ：passwor protection	1	0000	○
PF.02	Software version	-	-	-	*
PF.03 ～ PF.10	Reversed	-	-	-	*

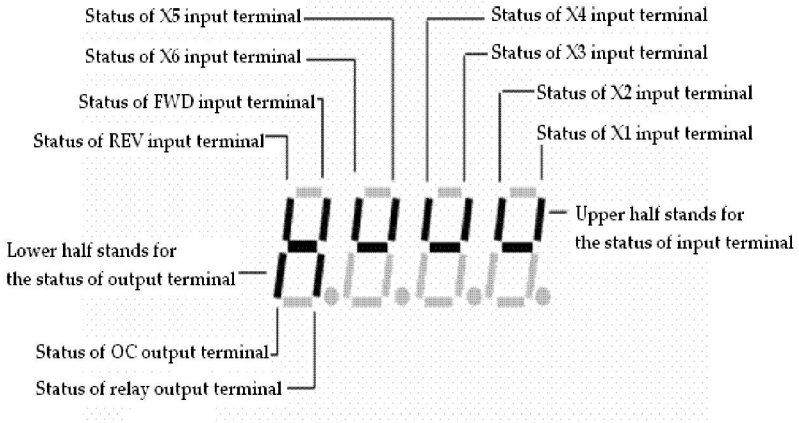
14. B—Monitor function parameters

B—Monitor function parameters					
Code	**Name**	**Description**	**Minmum unit**	**Factory setting**	**Change**
b-00	Output frequency	Present output frequency	0.01Hz		*
b-01	Reference frequency	Presetn reference frequency	0.01Hz		*
b-02	Output voltage	Valid value of present output voltage	1V		*
b-03	Output current	Valid value of present output current	0.1A		*
b-04	Bus voltage	Present DC bus voltage	1V		*
b-05	Module temperature	IGBT Temperature of heatsink	10C		*
b-06	Motor overload speed	Present motor overload speed	1r/min		*
b-07	Operating time	one continusly operating time of inverter	1 hour		*
b-08	Input/output terminal’s status	Digital input/output terminal’s status	——		*
b-09	Analog input VI	Value of analog input VI	0.01V		*
b-10	Analog	Value of analog input	0.01V		*

	input CI	CI			
b-11	External pulse input	Input value of external pulse range	1ms		*
b-12	Inverter rated current	Inverter rated current	0.1A		*
b-13	Inverter rated voltage	Inverter rated voltage	1V		*
b-14	no unit dispaly	no unit dispaly	1		*
b-15	Inverter power class	Inverter power class	-		*
b-16	Display present counter value	Display present counter value	-		*
b-17	Reversed	-	-		*
……	Reversed	-	-		*
b-40	Reversed	-	-		*

Note ：The corresponding relationship of monitor parameter input/output terminals and their status display are shown below:

“ ”shows disabled（lamp off），“ ”shows enabled（lamp on）


Status of X5 input terminal
Status of X6 input terminal
Status of FWD input terminal
Status of REV input terminal
Status of X4 input terminal
Status of X3 input terminal
Status of X2 input terminal
Status of X1 input terminal
Upper half stands for
the status of input terminal
Lower half stands for
the status of output terminal
Status of OC output terminal
Status of relay output terminal

4-2. Parameter description

4-2-1. Basic operating function parameters（Group P0）

P0.00	Control mode selection	Range：0～1	0

0：V/F control
1：Open loop vector control

P0.01	Reference frequnce selection	Range：1～8	0

0：Panel analog potentiometer setting

1：▲ and ▼ keys on the panel
You can set the reference frequency via ▲ and ▼ keys on the panel.

2：Keyboard digital
Initial frequency is the value of P0.02, to set the reference frequency via keyboard by modifying the value of P0.02.

3：Terminal UP/DOWN
Initial frequency is the value of P0.02, to set the frequency via terminal UP/DOWN.

4：Serial port (remote control)
Initial frequency is the value of P0.02, to set the frequency via serial port.

5：VI analog input (VI－GND)
The reference frequency is set by analog voltage input via terminal VI, the input voltage range is DC 0~10V. The corresponding relationship

between frequency and VI is decided by parameters P1.00~P1.05.

6：CI analog input (CI－GND)

The reference requency is set by analog voltage/current of terminal CI and the input range is DC: 0~10V (if jumper JP3 is placed on “V” side), DC:4~20mA (if jumper JP3 is placed on “A” side). Then corresponding relationship between frequency and CI input is decided by parameter P1.06~P1.10.

7：Pulse input (PLUSE)

The referency frequency is set by pulse input via pulse terminal (can only be input via terminal X6). The corresponding relationship between frequency and PLUSE input is decided by parameters P1.11~P1.15.

8：Combination

Please refer to P3.00，to set the reference frequency via combination of channels.

P0.02	**Digital frequency setting**	**Range：Upper limit of of frequncy～lower limit of frequency**	**50.00Hz**

When the reference frequency is set in digital mode（P0.01＝1,2,3,4），The setting of P0.02 is the inverter’s initial frequency value.

P0.03	**Methods of inputting operating commands**	**Range：0,1,2**	**0**

0：Panel control

Input operating commands via panel start or stop the inverter by pres FWD STOP RESET a JOG REV on the panel.

1：Terminal control

Input operating commands via externals such as FWD, REV, X1~X6 to start or stop the inverter.

2：Serial port control

To start or stop the inverter via RS485 port.

Note：The control modes can be controlled by modifying P0.03, while please be careful to use this method during operating.

P0.04	Set running direction	Range：00～11	00

The unit's place of this parameter is active with panel control mode to operate jog.

Unit's place of LED：

0：Jog forward in panel control mode

1：Jog reverse in panel control mode

Ten's place of LED：

0：Reverse running is permissible.

1：Reverse running is prohibit. The inverter will stop output when reverse command is input.

P0.05	Run forward/reverse dead time	Range：0.0～120.0s	0.1s

It is the transition time at zero frequency time when the inverter switching its running direction, as shown in Fig.4-1 as t_1.

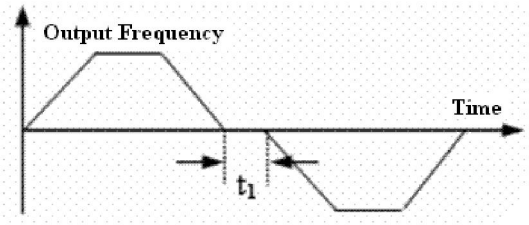


Fig. 4-1 Run forward/reverse dead time

P0.06	**Max output frequency**	**Range：50.00Hz～500.0Hz**	**50.00Hz**
P0.07	**Basic running frequency**	**Range：1.00Hz～500.00Hz**	**50.00Hz**
P0.08	**Max output voltage**	**Range：1～480V**	**Rated**

The max output frequency is the highest permissible frequency of the inverter, as shown in Fig.4-2.

Basic running frequency is the lowest frequency when the inverter output the highest voltage and it is usually rated frequency of the motor, as shown in Fig4-2 as FB.

The max output voltage is the relevant output voltage when the inverter output basic running frequency and it is usually rated voltage of the motor, as shown in Fig.4-2 as Vmax.

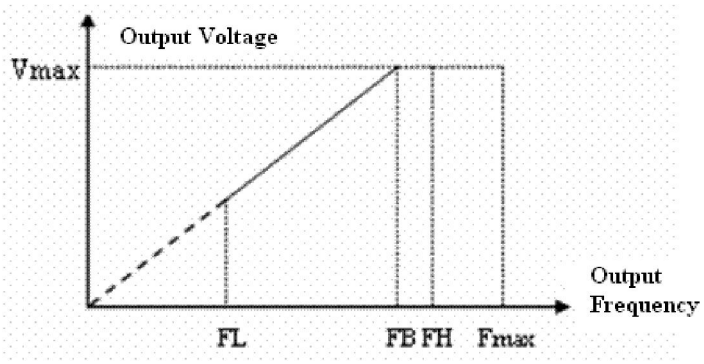
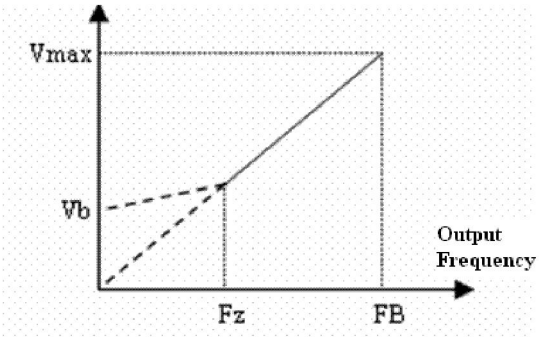


Fig. 4－2 Characteristic parameter

FH, FL are defined by P0.19 and P0.20 as upper limit of of frequency and lower limit of frequency.

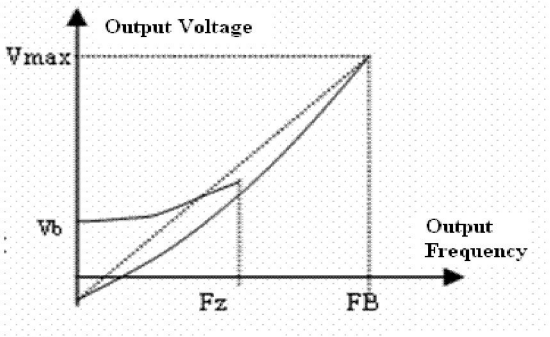
P0.09	Torque boost	Range：0.0%～30.0%	2.0%

In order to compensate the torque drop at low frequency, the inverter can be boost the output voltage so as to boost the torque, the torque boost of constant torque curve and square torque curve are shown in Fig. 4-3 as a, b.



Vb：Manual torque boost voltage Vmax：Max output voltage
Fz：Cut-off frequency for torque boost FB：Basic running frequency

(a) Torque boost of constant torque curve



Vb：Manual torque boost voltage Vmax：Max output voltage
Fz：Cut-off frequency of torque boost FB：Basic running frequency

(b) Torque boost of square torque curve

Fig. 4—3 Torque boost

P0.10	**Cut-off frequency of torque boost**	**Range :0.00Hz～Basic running frequency**	**25.00Hz**

This function defines the cut-off frequency of torque boost, as shown in

Fig. 4-3 as Fz. Then cut-off frequency is suitable for any V/F curve defined by P0.02.

P0.11	Torque boost mode	Range：0,1	0

0：Manual torque boost

Torque boost voltage is defined by parameter P0.09. The boost voltage is fixed while motor will be easily magnetism saturation with light load.

1：Auto torque boost

Torque boost voltage will change with the motor stator's current changes. The bigger the stator is, the higher the boost voltage.

$$\text{Boost Voltage} = \frac{P0.09}{100} \times \text{Motor's Rated Voltage} \times \frac{\text{Inverter's output current}}{2 \times \text{Inverter's rated current}}$$

P0.12	Carrier frequency	Range ：1.0K～14.0K	8.0K

Carrier frequency will effects the motor's noise and heat waste.The relationship among carier frequency, motor noise, leak current, and dist are shown below:

Carrier frequency	Decrease	Increase
Motor noise	↑	↓
Leakage current	↓	↑
Disturbance	↓	↑

Note：(1) In order to achieve better performances, the ratio of carrierfrequency to the maximum running frequency of the inverter should be less than 36.

(2) When the carrier frequency is low, the current display value may has error.

P0.13	Acc/Dec mode	Range：0、1	0

0：Linear Acc/Dec mode

Output frequency increases or decreases according to a constant rate,as shown in Fig. 4-4.

1：S ramp Acc/Dec mode

Output frequency increases or decreases according to a S-shape curve, as shown in Fig.4-5.

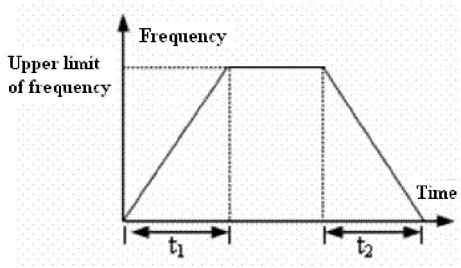


Fig.4-4 Linear Acc/Dec

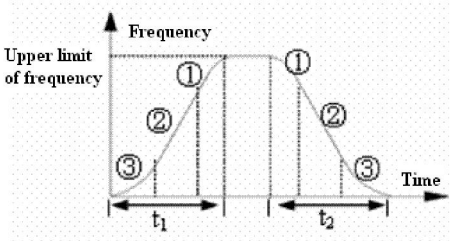


Fig.4-5 S-shape curve

P0.14	**Low speed time of S ramp**	**Range：10.0%～50.0%（Acc/Dec time），P0.14＋P0.15<90%**	**20.0%**
P0.15	**Linear time of S ramp**	**Range：10.0%～80.0%（Acc/Dec time），P0.14＋P0.15<90%**	**60.0%**

P0.14 and P0.15 are only active when Acc/Dcc mode is S ramp Acc/Eec mode（P0.13 ＝1） and P0.14+P0.15 < 90%.

Low speed time of S ramp is shown in Fig.4-5 as ③, where the changing rate of output frequency increases for 0.

Linear time of S ramp is shown in Fig.4-5 as ②, where the changing rate of output frequency is constant.

High speed time of S ramp is shown in Fig.4-5 as ①, where the changing rate of output frequency increases from 0. High speed time＝100%－P0.14－P0.15.

Note： S ramp Acc/Dec mode is suitable for the start/stop of elevator, conveying belt, conveying load and so on .

P0.16	**Acc/Dec time unit**	**Range：0, 1**	**0**

This function defines Acc/Dec time unit

0：second

1：minute

Note： (1) This function is active for all the process of Acc/Dec except jog running.

(2) Select second as time unit is recommended.

P0.17	**Acc time 1**	**Range：0.1～6000.0**	**10.0**
P0.18	**Dec time 1**	**Range：0.1～6000.0**	**10.0**

Acc time is the time taken for the motor to accelerate from 0 Hz to upper limit of frequency, as t_1 in Fig.4-6; Dec time is the time taken for the motor to decelerate from upper limit of frequency to 0 Hz, as t_2 in

Fig.4-6.

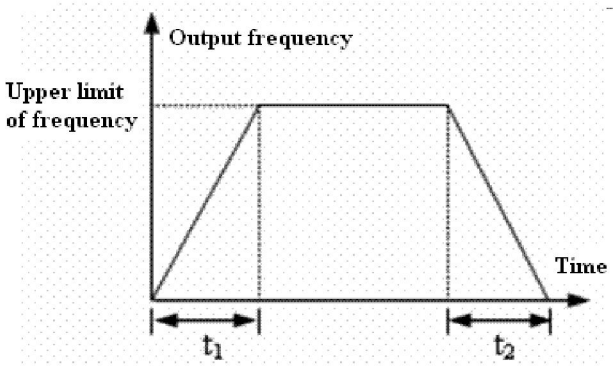


Fig.4-6 Acc/Dec time

Note：(1)This series inverter defines seven kinds of Acc/Dec time. Here only defines Acc/Dec time 1, Acc/Dec time 2~7 are defined in P3.14~P3.25.

(2)Minute and second as the time unit of Acc/Dec time 1~7 can be selected via P0.09 and the default unit is second.

P0.19	**Upper limit of frequency**	**Range ： lower limit of frequency ～ max output frequency**	**50.00Hz**
P0.20	**Lower limit of frequency**	**Range：0.00Hz～upper limit of frequency**	**0.00HZ**
P0.21	**Lower mimit of frequency mode**	**Range： 0：running with lower limit of frequency 1：stop**	**0**

P0.19 and P0.20 define the upper and lower frequency of frequencies

respectively, as shown in Fig.4-2 as FH and FL.

When the actual frequency is lower than the lower limit of frequency, inverter will accelerate with the accelerate time which you have set, and then after reaching the lower limit of frequency, inverter will running with the lower limit of frequency if the running mode is 0 and it will decelerate output frequency continuously until 0Hz with the running mode is 1.

P0.22	**V/F curve setting**	**Range：0～4**	**0**
P0.23	**V/F frequency value F1**	**Range：0.00～P0.25**	**0.00Hz**
P0.24	**V/F voltage valueV1**	**Range：0～ P0.26**	**0.0%**
P0.25	**V/F frequency value F2**	**Range：P0.23 ～ P0.27**	**0.00Hz**
P0.26	**V/F voltage value V2**	**Range：P0.24 ～ P0.28**	**0.0%**
P0.27	**V/F frequency value F3**	**Range：P0.25 ～ P0.07 basic running frequency**	**0.00Hz**
P0.28	**V/F voltage value V3**	**Range：P0.26 ～ 100.0%**	**0.0%**

This group of parameters defines the flexible V/F setting modes of this inverter to satisfy the requirement of different loads. Four fixed curves and one user-defined curve can be selected according to P0.22.

P0.22=0， V/F curve is constant torque curve, as shown in Fig.4-7 as curve 0.

P0.22=1，V/F cuve is 1.2 order torque-reducing curve，as shown in Fig. 4-7 as curve 1.

P0.22=2，V/Fcuve is 1.7 order torque-reducing curve，as shown in Fig.4-7 as curve 2.

P0.22=3，V/Fcuve is 2.0 order torque-reducing curve，as shown in Fig.4-7 as curve 3.

To achieve best energy-saving effect, you can select 1,2 or 3 V/F curves according to the actual loads such as fans and pumps.

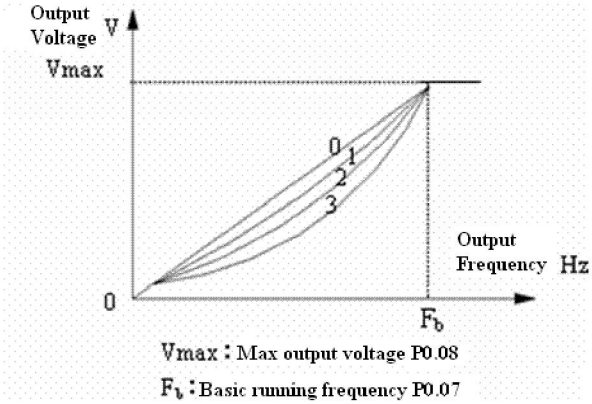
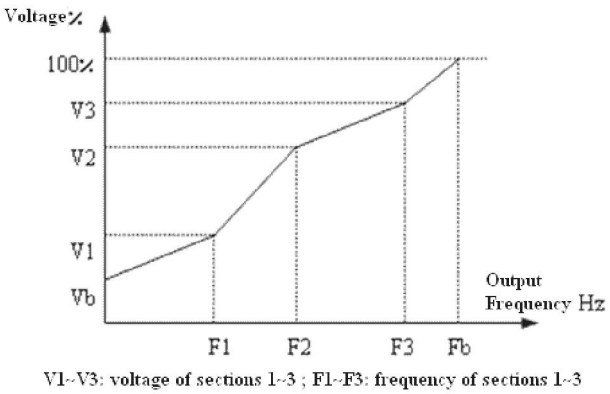


Fig.4-7 V/F curve



V1~V3: voltage of sections 1~3 ; F1~F3: frequency of sections 1~3

Fig. 4-8 User-defined V/F curve

When P0.22 is set to 4， you can define V/F curve via modifying (V1，F1), (V2，F2), (V3，F3) to satisfy the special load requirement, as shown in Fig.4-8. Torque boost is suitable for user-defined V/F curve.In Fig.4-8.

$$Vb = \text{Torque boost}\ (P0.09) \times V1$$

4-2-2. Parameters of reference frequency（Group P1）

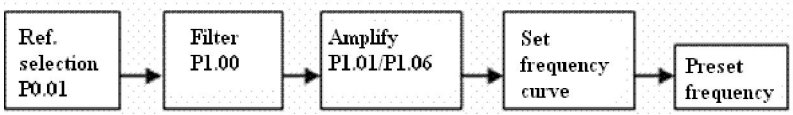
P1.00	**Time constant of analog filter**	**Range：0.01～30.00s**	**0.20s**

It is the constant time of the filter that is for internal sample picking by inverter when reference frequency is set by external analog channel.When the wire is too long or the interference is serious which can lead to reference frequency becomes wavy, you can increase filter time to improve the situation.The bigger the time constant is, the higher the immunity level, but the response time is prolonged with the increase of the time constant. That is, the smaller the time constant is, the shorter the response time, but the lower the immunity level.

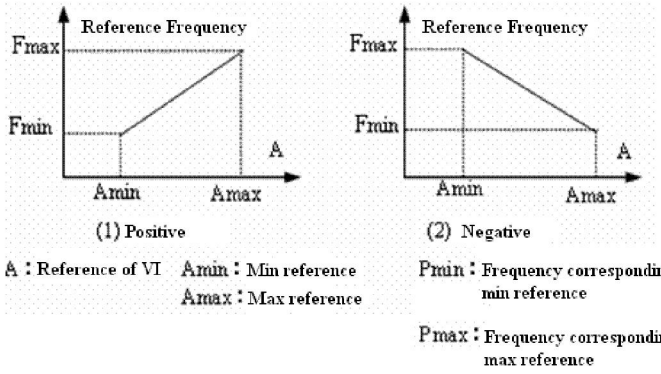
P1.01	**Gain of reference frequency selector of VI**	**Range：0.01～9.99**	**1.00**
P1.02	**Min reference of VI**	**Range：0.00～P1.04**	**0.00V**
P1.03	**Frequency corresponding to min reference of VI**	**Range：0.00～upper limit of frequency**	**0.00Hz**
P1.04	**Max reference of VI**	**Range：P1.04～10.00V**	**10.00V**
P1.05	**Frequency corresponding to max reference of VI**	**Range：0.00～upper limit of frequency**	**50.00Hz**

P1.06	**Gain of reference frequency selector of CI**	**Range：0.01～ 9.99**	**1.00**
P1.07	**Min reference of CI**	**Range：0.00～ P1.09**	**0.00V**
P1.08	**Frequency according to min reference of CI**	**Range：0.00～upper limit of frequency**	**0.00Hz**
P1.09	**Max frequency of CI**	**Range：P1.07 ～10.00V**	**10.00V**
P1.10	**Frequency according to max reference of CI**	**Range：0.00～upper limit of frequency**	**50.00Hz**
P1.11	**Max input pulse frequency of PULSE**	**Range：0.1～20.0K**	**10.0K**
P1.12	**Min reference of PULSE**	**Range：0.0～P1.14**	**0.1K**
P1.13	**Frequency corresponding to min reference of PULSE**	**Range：0.00～upper limit of frequency**	**0.00Hz**
P1.14	**Max reference of PULSE**	**Range：P1.12～P1.11**	**10.0K**
P1.15	**Frequency corresponding to max reference of PULSE**	**Range：0.00～upper limit of frequency**	**50.00Hz**
P1.16	**Input mode of CI**	**Range：0、1**	**0**

When VI, CI and PULSE are selected, the relationship between reference and the present frequency is shown below:



The relationship between VI and preset frequency is shown below:

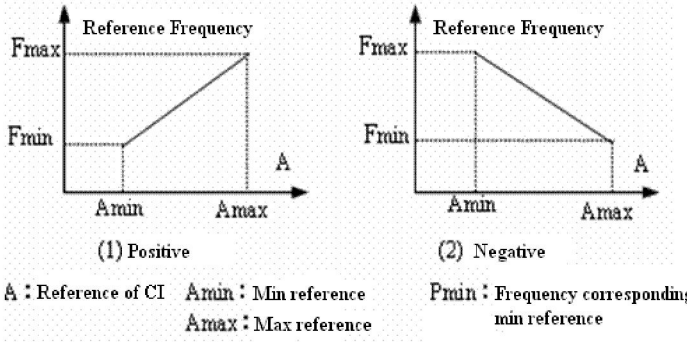


A : Reference of VI Amin : Min reference
Amax : Max reference

Pmin : Frequency corresponding to min reference

Pmax : Frequency corresponding to max reference

The relationship between CI and reference frequency is shown below:

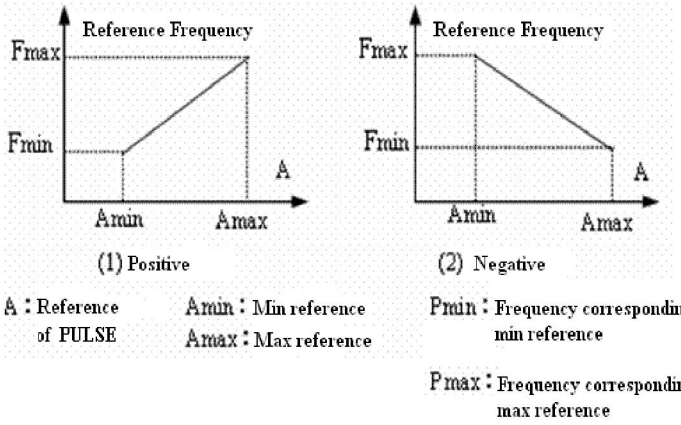


A : Reference of CI Amin : Min reference
Amax : Max reference

Pmin : Frequency corresponding to min reference

Pmax : Frequency corresponding to max reference

The relationship between PULSE and reference frequency is shown below:



4-2-3. Starting and braking parameters（Group P2）

P2.00	Starting mode	Range：0,1,2	0

0：Start from the starting frequency

Inverter starts at the starting frequency (P2.01) within the holding time of starting frequency (P2.02).

1：Brake first and then start

Brake with DC braking current (P2.03) within braking time (P2.04) and then start at starting frequency.

2：Start on the fly

When P2.00 is set to 2, it is suitable for repowering after instantaneous power off or restarting after external fault. As shown in Fig.4-9.

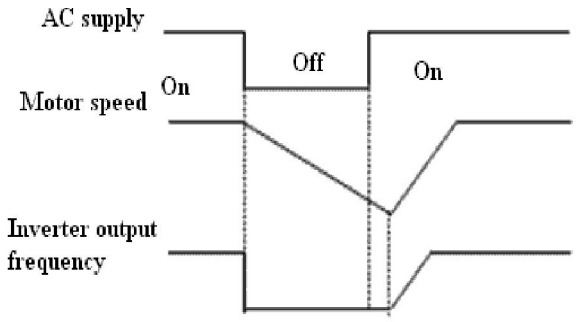


Fig.4-9 Start on the fly

Note：(1) Starting mode 0： It is recommended in general application or when the inverter drives synchromous motor.

(2) Starting mode 1: It is suitable for starting the motor that is running in forward or reverse with small inertial load, and it is not recommended for big inertial load.

(3) Starting mode 2: It is suitable for starting the motor that is in free stop or for restarting after instantaneous power off.

P2.01	**Starting frequency**	**Range：0.20～20.00Hz**	**0.50 Hz**
P2.02	**Holding time of starting frequency**	**Range：0.0～30.0S**	**0.0S**

Starting frequency points to the initial frequency when inverter starts, as shown in Fig.4-10 as Fs. Holding time of starting frequency points to the holding time while inverter is running at the starting frequency, as shown in Fig.4-10 as t_1.

Note：Starting frequency is not stricted by the lower limit of frequency

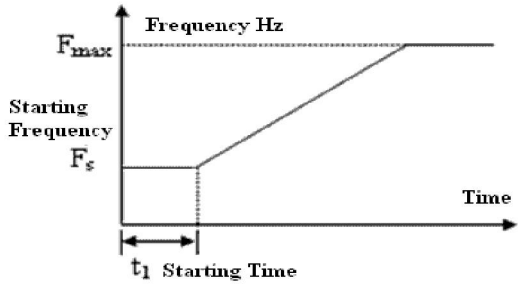


Fig.4-10 Starting frequency and starting time

P2.03	**DC injection braking current at start**	**Range：0～80(%)**	**0(%)**
P2.04	**DC injection braking time at start**	**Range：0.0～60.0S**	**0.0S**

When P2.00 is set to 1，P2.03 and P2.04 are active，as shown in Fig. 4-11 DC injection braking current at start is a percentage value of inverter's rated current. There is no DC injection braking when the braking time is 0.00s.

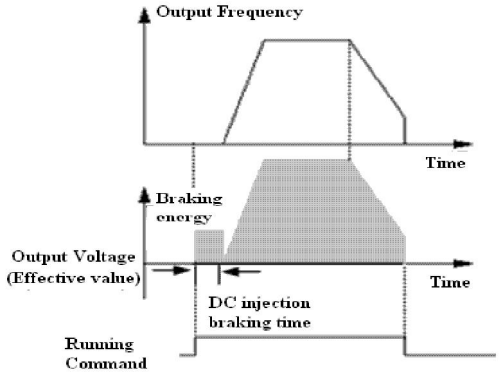


Fig.4-11 Starting mode 1

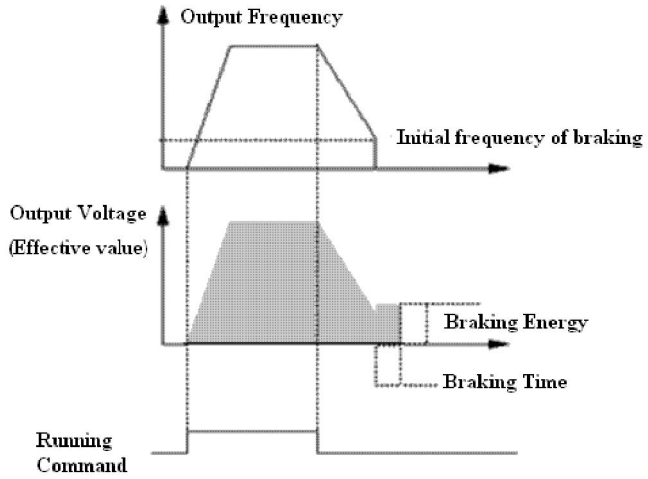


Fig. 4-12 Dec-to-stop+DC injection braking

P2.05	Stopping mode	Range：0,1,2	0

0：Dec-to-stop

After receiving the stopping command, the inverter reduces its output frequency within its Dec time and stops when the frequency becomes 0.

1：Coast to stop

After receiving the stopping command, the inverter stops output power immediately and the motor stops according to mechanical inertia.

2：Dec-to-stop＋DC injection braking

After receiving the stopping command, the inverter reduces its output frequency according to Dec time and then start to DC injection braking after the output frequency reaching the initial frequency of braking at stop as in P2.06.

P2.06	**DC injection braking initial frequency at stop**	**Range：0.0～15.00Hz**	**3.00Hz**
P2.07	**DC injection braking time at stop**	**Range：0.0～60.0S**	**0.0S**
P2.08	**injection braking current at stop**	**Range：0～80（%）**	**0(%)**

P2.08 refers to the set of DC injection braking current at stop which is the percentage value of inverter's rated current.There is no DC injection braking when the braking time is 0.0, as shown in Fig.4-12.

4-2-4. Auxiliary running parameters（Group P3）

P3.00	**Combination of frequency setting**	**Range：0～20**	**0**

When P0.01（Frequency setting mode）is set to 8，combination of frequency setting can be set through this parameter.

0：VI＋CI
1：VI－CI
2：External pulse reference＋VI＋Increase/Decrease key reference
3：External pulse reference－VI－Increase/Decrease key reference
4：External pulse reference＋CI
5：External pulse reference－CI
6：RS485＋VI+Increase/Decrease key reference
7：RS485－VI－Increase/Decrease key reference
8：RS485＋CI+Increase/Decrease key reference
9：RS485－CI-Increase/Decrease key reference

10：RS485＋CI＋External pulse reference
11：RS485－CI－External pulse reference
12：RS485＋VI＋External pulse reference
13：RS485－VI－External pulse reference
14：VI＋CI＋Increase/Decrease key reference＋Digital setting P0.02
15：VI＋CI－Increase/Decrease key reference＋Digital setting P0.02
16：MAX（VI，CI）
17：MIN（VI，CI）
18：MAX（VI，CI，PLUSE）
19：MIN（VI，CI，PLUSE）
20：VI，CI is active，VI is priority

P3.01	**Parameter initialization locking up**	**Range：LED unit's place 0~2，LED ten's place 0~2**	**00**

LED unit's place

0：All the parameters are allowed modifying.
1：Only P3.01 can be modified.
2：Only P0.02 and P3.01 can be modified.

LED ten's place

0：Disabled
1：Restore to factory setting
2：Clear fault record

Note：(1) The factory setting of P3.01 is 0 and allow all the parameters to be modified.After modifying this parameter, please set it as 0 if you want to modify other parameters.Also ,you can set

protective grade.

(2) P3.01 will be changed to 0 automatically after restoring to factory setting.

P3.02	Parameter copy	Range：0,1,2	0

0：Disabled

1：Parameter up load：Up load the parameters from inverter to remote opration panel.

2：Parameter down load：Down load the parameters from remote operation panel to inverter.

Note ：This function is still in developing.

P3.03	Auto energy-saving function	Range：0,1	0

0：Disabled

1：Enabled

Inverter can regulate output voltage through detecting load current to achieve energy-saving when the motor running without load or with light load. Auto energy-saving is suitable for the application with steady load and speed.

P3.04	AVR funciton	Range：0,1,2	0

AVR function points to regulating voltage automatically.When the input voltage of inverter fluctuates, AVR function can keep it steady.

In Dec-to-stop process, if AVR is disabled, the Dec time is short and the running current is big; if AVR is enabled, the motor decelerates steadily, the running current is small and the Dec time is prolonged.

0：Disabled

1：Enabled

2：Disabled in Dec process

P3.05	**Gain of slip compensation**	**Range：0～150(%)**	**0(%)**

This function can make suitable regulation for inverter's output frequency according to the load changes, and control the speed at a certain value with dynamic compensation for slip frequency of asynchronism motor. If use auto-torque boost function in addition, better low speed moment characteristic can be get. As shown in Fig.4-13.

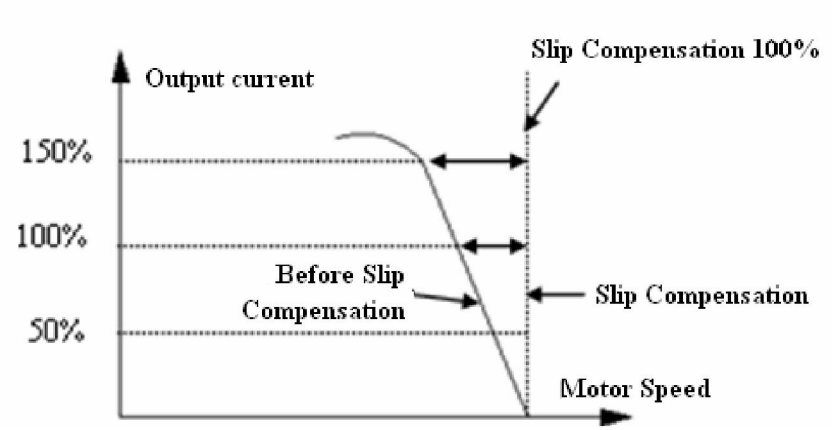


Fig.4-13 Slip Compensation

P3.06	**Jog operating frequency**	**Range：0.10～50.00Hz**	**5.00Hz**
P3.07	**Acc time of jog operation**	**Range：0.1～60.0S**	**5.0S**
P3.08	**Dec time of jog operation**	**Range：0.1～60.0S**	**5.0S**

Jog operating frequency has the highest priority. No matter what status

the inverter is in, once there is a jog operating command input, the inverter will run into jog operating frequency within Acc/Dec time of jog operation, as shown in Fig.4-14.

Acc time of jog operation means the time needed for inverter from 0 Hz to upper limit of frequency, Dec time of jog operation means the time needed for inverter from upper limit of frequency to 0 Hz.

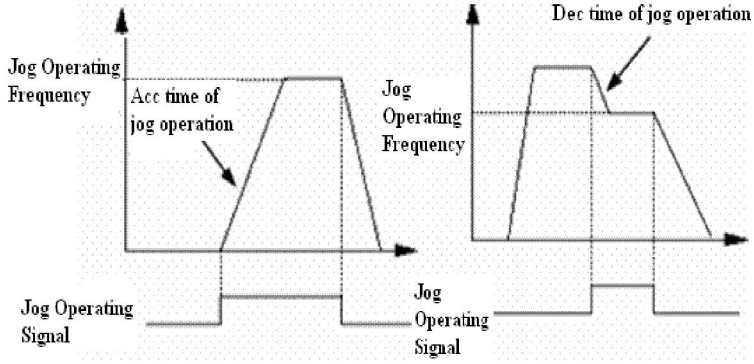


Fig 4-14 Jog operation

Note:(1) Jog operation can be controlled by panel, terminal and serial port.

(2) If jog operation command has been canceled, the inverter will stop according to Dec-to-time.

P3.09	**Communication configuration**	**Range：000～155**	**054**

You can change baud rate, digital format and communication mode by setting unit's place, ten's place and hundred's place of P3.09.

Unit's place of LED：Set baud rate, the values are shown below:

0：1200BPS
1：2400BPS
2：4800BPS
3：9600BPS
4：19200BPS
5：38400BPS

Ten's place of LED: Set digital format, the values are show below:

0：1－7－2 format，no parity check；1 stop bit ，7 data bits，2 stop bits，no parity check.

1：1－7－1 format，odd；1 stop bit，7 data bits，1 stop bits，odd

2：1－7－1 format，even；1 stop bit，7 data bits，1 stop bit，even

3：1－8－2 format，no parity check；1 stop bit，8 data bits，2 stop bits，no parity check.

4：1－8－1 format，odd；1 stop bit，8 data bits，1 stop bit, odd

5：1－8－1 format，even；1 stop bit，8 data bits，1 stop bit，even

6：1－8－1 format， no parity check；1 stop bit，8 data bits，1 stop bit，no parity check.

Hundred's place of LED ：undefined

Note：when choose Modbus-RTU communication mode，you should select digital format 3~6.

P3.10	Local address	Range：0～248	1

This parameter is used for identify the inverter's address in serial communication.

0 is the broadcast address. If take inverter as a slave, it will receive the command with 0 as broadcast address and will not answer the PC.

248 is the address with inverter as a host. If take inverter as host and set P3.10 as 248，it can send broadcast command to other inverters to

realize multi-machine .

P3.11	**Time threshod for judging communication status**	**Range：0.0～1000.0S**	**0.0S**

When serial port failed and the duration over the reference value, the inverter will judge it as communication fault.
When set the value as 0, the inverter will not detect the serial communication port and this function disabled.

P3.12	**Host PC response delay**	**Range：0～1000ms**	**5ms**

It refers to time from inverter's serial port receiving and executing the command of host PC to returning response to it.

P3.13	**Reference proportion of communication frequency**	**Range：0.01～1.00**	**1.00**

This parameter is used for setting the proportion coefficient according to frequency setting command which is receiving by inverter through RS485, the actual running frequency equivalent to this parameter multiply the frequency value receiving through RS485.
This parameter can also set running frequency proportion of several inverters in multimachine linkage mode.

P3.14	**Acc time 2**	**Range：0.1～6000.0**	**10.0**
P3.15	**Dec time 2**	**Range：0.1～6000.0**	**10.0**
P3.16	**Acc time 3**	**Range：0.1～6000.0**	**10.0**

P3.17	**Dec time 3**	**Range：0.1～6000.0**	**10.0**
P3.18	**Acc time 4**	**Range：0.1～6000.0**	**10.0**
P3.19	**Dec time 4**	**Range：0.1～6000.0**	**10.0**
P3.20	**Acc time 5**	**Range：0.1～6000.0**	**10.0**
P3.21	**Dec time 5**	**Range：0.1～6000.0**	**10.0**
P3.22	**Acc time 6**	**Range：0.1～6000.0**	**10.0**
P3.23	**Dec time 6**	**Range：0.1～6000.0**	**10.0**
P3.24	**Acc time 7**	**Range：0.1～6000.0**	**10.0**
P3.25	**Dec time 7**	**Range：0.1～6000.0**	**10.0**

Seven kinds of Acc/Dec time can be defined, and the inverter's Acc/Dec time 1~7 can be selected by different combination of control terminals. Please refer to the introductions of P4.00~P4.05 for the definitions of terminals used to select Acc/Dec time, also, you can refer to Acc/Dec time defined in P0.17 and P0.18.

P3.26	**Multi-frequency 1**	**Range：lower limit of frequency～upper limit of frequency**	**5.00Hz**
P3.27	**Multi-frequency 2**	**Range：lower limit of frequency～upper limit of frequency**	**10.00Hz**
P3.28	**Multi-frequency 3**	**Range：lower limit of frequency～upper limit of frequency**	**20.00Hz**
P3.29	**Multi-frequency 4**	**Range：lower limit of frequency～upper limit of frequency**	**30.00Hz**
P3.30	**Multi-frequency 5**	**Range：lower limit of frequency～upper limit of frequency**	**40.00Hz**
P3.31	**Multi-frequency 6**	**Range：lower limit of frequency～upper limit of frequency**	**45.00Hz**
P3.32	**Multi-frequency 7**	**Range：lower limit of frequency～**	**50.00Hz**

		upper limit of frequency	

These frequencies will be used in multi-step speed operation and simple PLC operation, please refer to the instructions of P4.00~P4.05 and P8.

P3.33	**Jump frequency 1**	**Range：0.00－500.00Hz**	**0.00Hz**
P3.34	**1 Range of jump frequency 1**	**Range：0.00－30.00Hz**	**0.00Hz**
P3.35	**Jump frequency 2**	**Range：0.00－500.00Hz**	**0.00Hz**
P3.36	**Range of jump frequency 2**	**Range：0.00－30.00Hz**	**0.00Hz**
P3.37	**Jump frequency 3**	**Range：0.00－500.00Hz**	**0.00Hz**
P3.38	**Range of jump frequency 3**	**Range：0.00－30.00Hz**	**0.00Hz**

P3.33~P3.38 define the functions that will let output frequency of the inverter avoid resonant point of mechnical load.The reference frequency of the inverter can do jump operation in the certain range of some jump frequency point, as shown in Fig. 6-15, you can define three ranges of jump frequency at most.

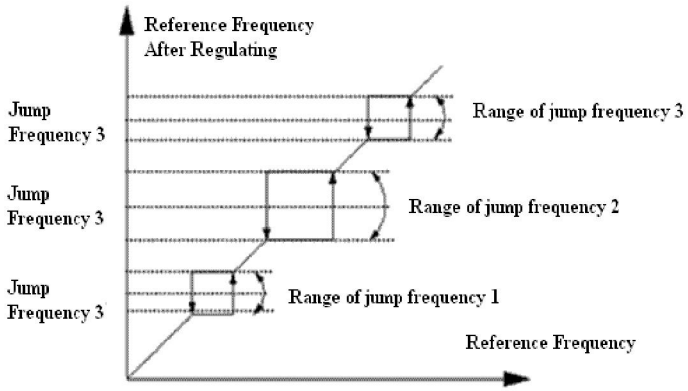


Fig.4-15 Jump frequency and range

P3.39	**Set running time**	**Range：0～65.535K hour**	**0.000K**
P3.40	**Accumulate running time**	**Range：0～65.535K hour**	*****

Acculate running time to reach the reference time (P3.39), the inverter will output signal, refer to function instruction of P4.08~P4.09.

P3.40 refers to the accumulating running time from factory till now.

P3.41	**Display parameters selection 1**	**Range：0000～FFFF**	**0000**

P3.41 controls that if the monitor parameters b-09～b-24 can be displayed in parameter group by four figures. The parameter values are in hex which should be changed to binary ones according to the sequence of monitor parameters when using. The relationship between four figures and parameters are shown in Fig.4-16.

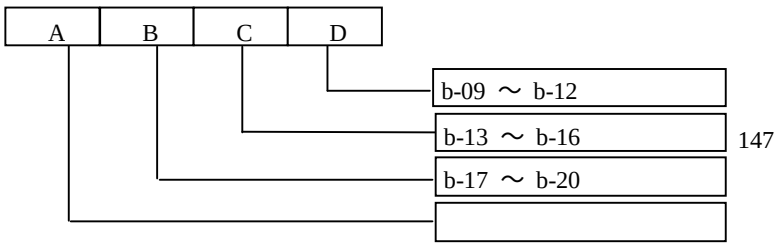


Fig.4－16 Display parameters selection 1

Note: A: Thousand's place, B: Hundred's place,

C: Ten's place, D: Unit's place

P3.42	**Display parameters selection 2**	**Range：0000～FFFF**	**0000**

P3.42 controls that if b-25～b-40 can be displayed in parameter group by four figures. The parameter values are in hex which should be changed to binary ones according to the sequency of monitor parameters when using.The relationship between four figures and parameters are shown in Fig. 4-17.

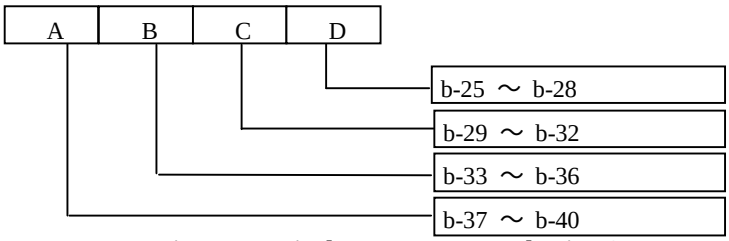


Fig.4－17 Display parameters selection 2

(Refer to P73 for b-09 ~ b-40)

Note: A: Thousand's place, B: Hundred's place,

C: Ten's place, D: Unit's place

P3.43	**Display parameters 3**	**Range：0000～4040**	**0001**

Ten's place, unit's place：used to set stop status

Thousand's place, hundred's place：used to set running status

Example: When you want to let the inverter display current value in

running status and display DC injucetion bus voltage value, you can set P3.43=0304. You can also press the key to view other monitor parameters.

P3.44	**Display coefficient without unit**	**Range：0.1～60.0**	**1.0**

P3.44：It is used to set proportion value between display value and output frequency of monitor parameter b-14.

Display value of b-14=Output frequency of inverter× P3.44

P3.45	**JOG/REV shift control mode**	**Range：0,1**	**0**

P3.45 is used to select the usage of JOG/REV key in the panel，the references are shown below:

0：select to JOG

1：select to REV

4-2-5. Function parameters of terminal（Group P4）

P4.00	**Function selection of input terminal X1**	**Range：0～37**	**1**
P4.01	**Function selection of input terminal X2**	**Range：0～37**	**2**
P4.02	**Function selection of input terminal X3**	**Range：0～37**	**3**
P4.03	**Function selection of input terminal X4**	**Range：0～37**	**10**

P4.04	**Function selection of input terminal X5**	**Range：0～37**	**17**
P4.05	**Function selection of input terminal X6**	**Range：0～37**	**18**
P4.06	**Function selection of input terminal X7**	**Range：0～37**	**0**
P4.07	**Function selection of input terminal X8**	**Range：0～37**	**0**

Multi-function input terminals X1~X8 support various functions which you can select freely to satisfy your requirement. You can define the function of X1～X8 by setting the value of P4.00～P4.07, refer to Table 4-1 for details, Among these terminals, X7 corresponds to FWD and X8 corresponds to REV.

Table 4-1 Multi-function selection

Setting	Functions	Setting	Functions
0	Control terminal leave unused	19	Frequency selector 1
1	Multi-step speed control terminal 1	20	Frequency selector 2
2	Multi-step speed control terminal 2	21	Frequency selector 3
3	Multi-step speed control terminal 3	22	Terminal control mode is forcibly enabled
4	Exteral terminal for forward jog operation	23	Control mode selector 1
5	Exteral terminal for reverse jog operation	24	Control mode selector 2
6	Acc/Dec time terminal 1	25	Start traverse operation
7	Acc/Dec time terminal 2	26	Reset traverse operation

8	Acc/Dec time terminal 3	27	Close-loop disabled
9	3-wire operation control	28	Pause the PLC operation
10	Coast-to-stop（FRS）	29	PLC disabled
11	External stop command	30	Reset PLC stopping status
12	DC injection braking command DB	31	Frequency reference is input via CI
13	Inverter running prohibit	32	Counter’s trig signal input
14	Frequency ramp up（UP）	33	Counter’s zero-cleaning signal input
15	Frequency ramp down（DOWN）	34	External interrupt input
16	Acc/Dec prohibit	35	Pulse frequency input （only valid for X6）
17	Reset signal（clear fault）	36	Autual length clearing input
18	External fault signal normally open input	37	

Introductions of the functions shown in Table4-1:

1～3：Multi-step speed control terminals. Up to 7 speed reference can be set by different ON/OFF (open/close) combination of the function terminals, at the same time, you can select corresponding Acc/Dec time.

Table 4-2 On/Off combination of function terminals

K_3	K_2	K_1	Frequency setting	Acc/Dec time
OFF	OFF	OFF	Common running frequency	**Acc/Dec time** 1
OFF	OFF	ON	Multi-step frequency 1	**Acc/Dec time** 1
OFF	ON	OFF	Multi-step frequency 2	**Acc/Dec time** 2

OFF	ON	ON	Multi-step frequency 3	**Acc/Dec time** 3
ON	OFF	OFF	Multi-step frequency 4	**Acc/Dec time** 4
ON	OFF	ON	Multi-step frequency 5	**Acc/Dec time** 5
ON	ON	OFF	Multi-step frequency 6	**Acc/Dec time 6**
ON	ON	ON	Multi-step frequency 7	**Acc/Dec time** 7

The above frequencies can be used in multi-step speed running and simple PLC running, this manual take multi-step speed running as an example.

The definition of X1, X2 and X3 are shown below:

P4.00=1, P4.01=2, P4.03=3，X1, X2 and X3 can be used to achieve multi-step speed operation, as shown in Fig.4-18.

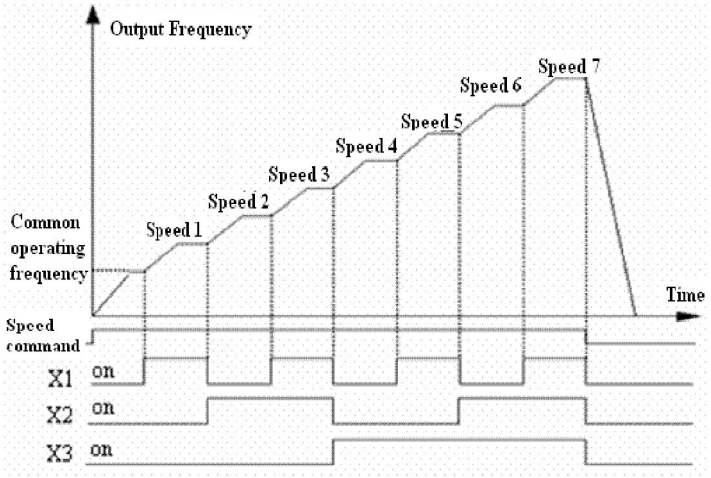


Fig.4-18 Multi-step speed operation

In Fig.4-19 terminal control is selected, the operating direction is

controlled by K_7、K_8. In Fig.4-18, Common operating frequency or 1～7 multi-step frequency can be controlled by different combination of K_1, K_2, K_3.

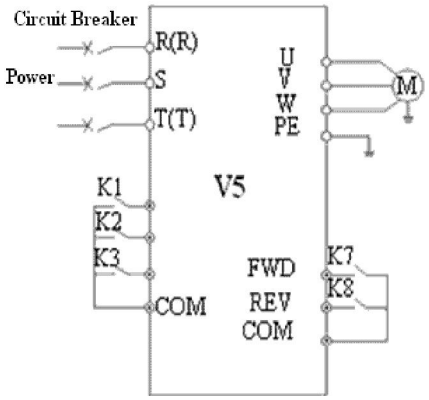


Fig.4－19 Wire of multi-step speed operation

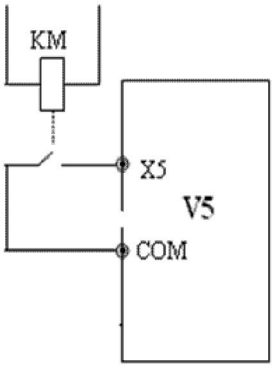


Fig.4-20 External device fault input

4～5：External terminals control jog operation JOGP/JOGR. When choose terminal control (P0.03=1), JOGP is used as forward jog operation，JOGR is used as reverse jog operation. Jog operating frequency and jog Acc/Dec time are defined in P3.06~P3.08.

6～8：Acc/Dec time selection

Table 4-3 Acc/Dec time selection

Terminal 3	Terminal 2	Terminal1	Acc/Dec time selection
OFF	OFF	OFF	Acc time 1/Dec time 1
OFF	OFF	ON	Acc time 2/ Dec time 2
OFF	ON	OFF	Acc time 3/ Dec time 3
OFF	ON	ON	Acc time 4/ Dec time 4

ON	OFF	OFF	Acc time 5/ Dec time 5
ON	OFF	ON	Acc time 6/ Dec time 6
ON	ON	OFF	Acc time 7/ Dec time 7

Through the ON/OFF combination of Dec time terminal, you can select dec time 1~7.

9: 3-wire operation control, refer to functional instruction of P4.08.

10:Coast-to-stop（FRS）, this function has the same meaning as the description in P2.05, while here it is achieved by terminal controlling which is convenient for remote control.

11:External stop command, this command is valid for all the running channels and it can stop the inverter according to the setting mode in P2.05.

12: DC injection braking command DB, the terminal can be used to perform DC injection braking to the motor that is running so as to realize the emergent stop and accurate location of the motor. Initial braking frequency, braking time and braking current are defined by P2.06~P2.08. Braking time is the greater value between P2.07 and the effective continuous time defined by this control terminal.

13：Inverter running prohibit. When the terminal is enabled, the inverter that is operating will coast to stop and it is prohibited to restart. This function is mainly used in application with requirements of safety protection.

14~15: Frequency ramp up (UP)/Frequency ramp down(DOWN)

The terminal can be used to increase or decrease the frequency. Its function is the same with operating keys on the panel, which enables remote control. This terminal is enabled when P0.01=3. Increase or decrease rate is determined by P4.09.

16: Acc/Dec prohibit. The terminal can make the motor operate at present speed without being influenced by external signal (except stopping command).

Note: Disabled in normal dec-to-stop.

17: Reset signal. The inverter can be reset via this terminal when the inverter has a fault. The function of this terminal is the same with that of ENTER DATA on the panel.

18: External fault signal normally open input. The fault signal of external equipment can be input via the terminal, which is convenient for the inverter to monitor the external equipment. Once the inverter receives the fault signal, it will display "E-13". Refer to Fig.4-20.

19~21: Frequency selector 1. Different ON/OFF combination of terminals 19, 20 and 21 can select reference frequency as shown in Table 4-4. The inverter will be active this function and P0.01 later.

Table 4-4 Frequency selector

Frequency selector 3	Frequency selector 2	Frequency selector 1	Frequency selector
OFF	OFF	OFF	Hold the setting
OFF	OFF	ON	Digital setting
OFF	ON	OFF	Terminal UP/DOWN setting
OFF	ON	ON	Serial port setting
ON	OFF	OFF	VI
ON	OFF	ON	CI
ON	ON	OFF	PULSE
ON	ON	ON	Combination setting (refer to P3.01)

22：Terminal control mode is forcibly enabled. When this terminal is enabled, the running mode will be turn to terminal control.

23～24: Control mode selection. Control mode can be selected via ON/OFF combination of terminals.The inverter will be active this function and P0.03 later.

Table 4-5 Control mode

Terminal 2	Terminal 1	Control mode
OFF	OFF	Hold the control mode
OFF	ON	Panel control mode
ON	OFF	Terminal control mode
ON	ON	Serial port control mode

25：Start traverse operation. When the traverse operation is as "manual", the traverse function will be enabled if this terminal is enabled, see Group P9 for details.

26：Reset traverse operation. No matter the traverse operation is "Manual" or "Auto", close-loop this terminal will clear all the memorized information of traverse operation. Disconncet this terminal can restart traverse operation. Refer to P9 for parameters instruction.

27：Close-loop disabled. The terminal can be used to flexible switching the close-loop operation and low level operation, and the setting of start/stop control, direction, Acc/Dec time mode in low level operation.

Note：Switching between close-loop operation and low level operation can be realized only when close-loop is enabled (P7.00 =1).

28：Pause the PLC operation. The terminal is used to realize pause control, when this terminal is enabled, the inverter will run in 0 Hz and PLC will not accumulate time; when this terminal is disabled, inverter will start with auto speed and PLC continue to run. Refer to group P8 for instructions.

29：PLC disabled. This terminal can be used to flexible switching the PLC operation and low level operation.

Note：The switching between PLC operation and low level operation only when PLC is running (the unit's place of P8.00 is not to 0)

30：Reset PLC stopping status. When PLC is in stopping status, the enabled terminal can clear PLC running stage, running time, running frequency and other informations of PLC stopping memory. Refer to P8 for instructions.

31：Frequency reference is input via CI. Frequency reference is input via CI forcibly when the terminal is enabled, and it will involute when the terminal is disabled.

32：Counter's trig signal input. This terminal is used to input pulse signal to the internal counter of the inverter. The highest pulse frequency is 200Hz. The present counting value can be saved at power off. See P4.22 and P4.23 for details.

33：Counter's zero-cleaning signal input. It is used to clear the counter to zero in conjunction with terminal 43.

34：External interrupt input. After receiving external interrupt input signal, inverter will lock output and running in 0 Hz, once the interrupt input signal release, the inverter will start on the fly and continue the PLC operation.

35：Pulse frequency input （only valid for X6）. This terminal can receive pulse signal as reference frequency, please refer to P1.11~P1.15 for the relationship between pulse frequency of input signal and reference frequency.

36: Autual length clearing input. If this terminal is enabled, the autual length parameter P9.09 will be cleared to zero.

P4.08	**FWD/REV operation**	**Range：0～3**	**0**

	mode selection		

This parameter defineds four operaion modes via which external terminals can control inverter.

0：2-wire control mode 1

K2	K1	Running Command
0	0	Stop
0	1	Forward
1	0	Reverse
1	1	Stop

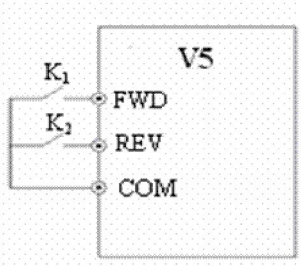


Fig.4-21 2-wire operation mode 1

1：2-wire control mode 2

K2	K1	Running Command
0	0	Stop
1	0	Forward
0	1	Reverse
1	1	Stop

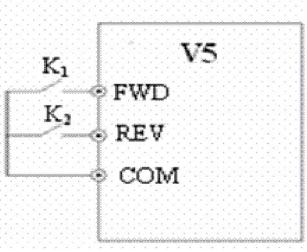


Fig.4-22 2-wire operation mode 2

2：3-wire control mode 1

SB1：Stop button

SB2：Forward button

SB3：Reverse button

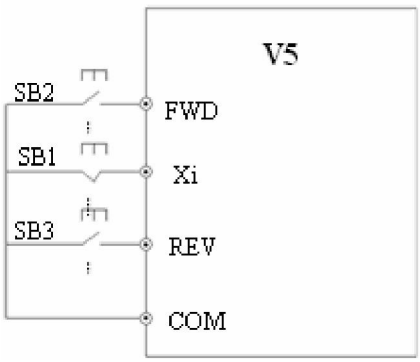


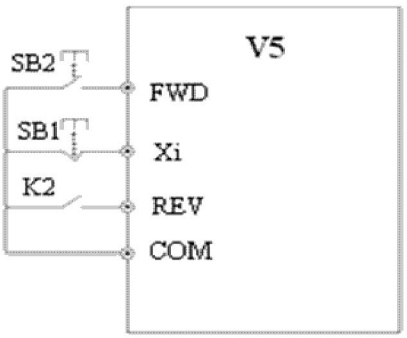
Fig. 4-23 3-wire operation mode 1

Xi is the multi-function input terminal of X1~X6, here you should define its function as No.9 “3-wire control mode”.

3：3-wire control mode 2

SB1：Stop button

SB2：Running button



K2	Direction
0	Forward
1	Reverse

Fig.4-24 3-wire control mode 2

Xi is the multi-function input terminal of X1~X6，here you should define its function as No.9 “3-wire control mode”.

Note：When the inverter stops due to fault, it will start immediately if the terminal control mode and terminal FWD/REV are enabled and the fault is cleared.

P4.09	**UP/DOWN speed rate**	**Range：0.01～99.99Hz/s**	**1.00 Hz/s**

This parameter defines the change rate of reference frequency that is changed by UP/DOWN.

P4.10	**Bi-direction open-collector output terminal OC**	**Range：0～20**	**0**
P4.11	**Relay output selector**	**Range：0～20**	**15**

Bi-direction oper-collector output terminal OC，the options of this parameter are shown in Table 4-6.

Table 4-6 Functions of output terminals

Setting	Functions	Setting	Functions
0	Inverter running (RUN)	11	PLC is finished after one cycle
1	Frequency arriving signal(FAR)	12	Specified counting value arriving
2	Frequency detection threshold (FDT1)	13	Mid counting value arriving
3	Frequency detection threshold (FDT2)	14	Inverter Ready running finished （RDY）
4	Overload pre-alarm（OL）	15	Inverter fault
5	Inverter under voltage locking （LU）	16	Start frenquence running time
6	External fault stop（EXT）	17	Start DC injection braking time

7	Output frequency arrive upper limit（FH）	18	Stop braking time
8	Output frequency arrive lower limit（FL）	19	High and lower limits of traverse operating frequency
9	Inverter zero speed running	20	set running time arriving
10	Simple PLC Pause running	21	

Instructions of the functions shown in Tabel 4-6:

0：Inverter running（RUN）. Inverter is in the running status and the terminal outputs indication signal.

1：Frequency arriving signal（FAR）. Refer to P4.12 for function instruction.

2：Frequency detection threshold（FDT1）. Refer to P4.11~ P4.12 for function instruction.

3：Frequency detection threshold（FDT2）. Refer to P4.13～P4.14 for function instruction.

4：Overload pre-alarm（OL）. If the output current is higher than the value defined by P4.24 and the time is longer than the value defined by P4.25, the inverter will output indicate signals. This function is mainly used in pre-alarm.

5：Inverter under voltage locking（LU）. While inverter is in running process, if the DC injection bus voltage is lower than the limit value, “E-11” will be displayed in LED and indicate signal will be output.

6：External fault stop（EXT）. An indicate signal will be output if inverter outputs trigging signal caused by external fault.

7：Output frequency arrive upper limit（FH）. An indicate signal will be output if reference frequency≥upper limit of frequency and the running frequency arrives the upper limit of frequency.

8：Output frequency arrive lower limit（FL）. An indicate signal will be output if reference frequency≤lower limit of frequency and the running frequency is lower than low limit of frequency.

9：Inverter zero speed running. The output frequency of inverter is 0 , while the terminal will output indicate signal when inverter is in running status.

10：Simple PLC Pause running finished. An indicate signal (single pulse signal, 500ms width) will be output if the present stage of PLC operation is finised.

11: PLC is finished after one cycle running. An indicate signal (single pulse signal, 500ms width) will be output if one cycle running of simple PLC is finished.

12：Specified counting value arriving

13：Mid counting value arriving

12,13 refer to P4.22~P4.23 for function instruction.

14：Inverter Ready running finished（RDY）.If RDY signal is output, it means the drive has no fault, its DC bus voltage is normal and it can receive starting command.

15：Inverter fault. If there is fault with inverter, indicate signal will be output.

16：Start frenquence running time

17：Start DC injection braking time

18：Stop braking time

19：Upper and lower limits of traverse operating frequency. An indicate signal will be output if the traverse operating frequency calculated by central frequency is higher than upper limit of frequency (P0.19) or lower than the lower limit of frequency (F0.20), as shown in Fig. 4-25.

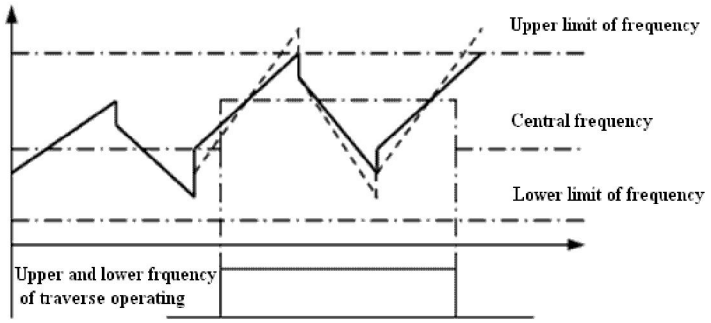


Fig.4-25 Upper and lower limits of traverse operating frequency

20：Set running time arriving.When the accumulating time（P3.40）arrive the reference time (P3.39), an indication signal will be output.

P4.12	**Detecting range of frequency arrive（FAR）**	**Range：0.00～50.00Hz**	**5.00Hz**

This parameter is the additional definition of No. 1 function in Table4-6. As shown in Fig.4-26, when the output frequency of inverter is within the detecting range of reference frequency, pulse signal will be output.

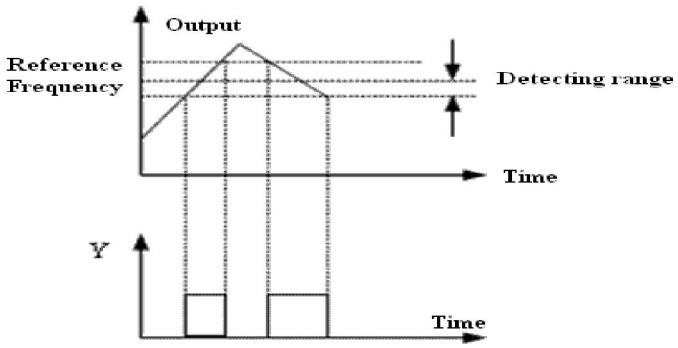


Fig 4-26 Frequency arriving signal

P4.13	**FDT1（freqeuncy）level**	**Range ： 0.00 ～ upper limit of frequency**	**10.00Hz**
P4.14	**FDT1 lag**	**Range：0.00～50.00Hz**	**1.00Hz**
P4.15	**FDT2（frequency）level**	**Range ： 0.00 ～ upper limit of frequency**	**10.00Hz**
P4.16	**FDT2 lag**	**Range：0.00～50.00Hz**	**1.00Hz**

P4.13～P4.14 is the additional definition of No.2 function in Fig.4-6, P4.15～P4.16 is the additional definition of No.3 function in Fig.4-6, The both have the same usage and the following take P4.13～P4.14 as an example to introduce.When the output frequency over a certain frequency(FDT1 level), indication signal will be output until the output frequency fall to the value which is lower than the certain frequency (FDT1 level－FDT1 lag)，as shown in Fig. 4-27.

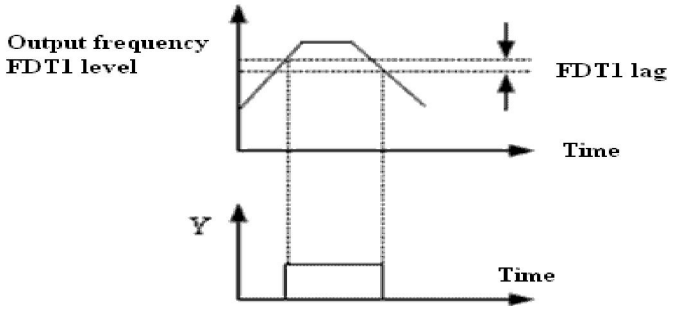


Fig.4-27 FDT level

P4.17	**Analog output selection (AO)**	**Range：0～7**	**0**
P4.18	**Analog output gain (AO)**	**Range：0.50～2.00**	**1.00**

Table 4-7 Output terminals

No.	Function	Range
0	Output frequency	0~upper limit of frequency
1	Output current	0－2×rated current
2	Output voltage	0－1.2×rated voltage of load motor
3	Bus voltage	0－800V
4	PID reference	0~10V
5	PID feedback	0~10V
6	VI	0~10V
7	CI	0~10V/4~20mA

As to the analog output of AO, you can adjust the output gain to change the measuring range or calibrate the meter.

P4.19	AO output mode	Range：0、1	1

0：4 ～20mA

1：0 ～10V

P4.20	DO output terminal	Range：0～7	0

Refer to Table 4-7 for function selection of DO output terminal.

P4.21	DO max pulse output frequency	Range：0.1～20.0（max 20K）	10.0K

This parameter defines the max output frequency of DO terminal.

P4.22	Preset counting value arriving	Range：P4.23～9999	0
P4.23	Mid counting value arriving	Range：0～P4.22	0

P4.22, P4.23 are the additional definition of No.12,13 functions in table 4-6.

Preset counting value arriving: It defines after Xi receives the relay or OC (bi-direction open-collector output terminal) will output a signal.

For example: as shown in Fig. 4-28, when the eighth pulse signal is received by terminal Xi, OC outputs an indicating signal and F7.33=8 at this time.

Mid counting value arriving: When Xi receives the number of pulse F7.34, OC or the relay will output a signal which will last until preset counting value arrives.

As shown in Fig. 4-28, when Xi receives the 5th pulse, the realy outputs an indication signal. It lasts until X1 receives the 8th pulse. At this time, P4.23=5. The mid counting value will be disabled if it is bigger than preset counting value.

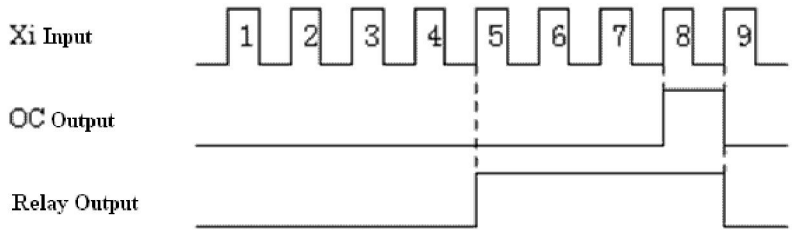


Fig.4—28 Preset counting value arriving and Mid counting value arriving

P4.24	**Overload pre-alarm detection level**	**Range：20－200(%)**	**130(%)**
P4.25	**Overload pre-alarm delay time**	**Range：0.0－20.0S**	**5.0S**

If output current over the detecting level set by P4.24 continuously （Actual detecting current level＝P4.24×inverter's rated current），Bi-direction open-collector will output available signal after the delay time set by P4.25(refer to Fig.4-29 and P4.11 for details).

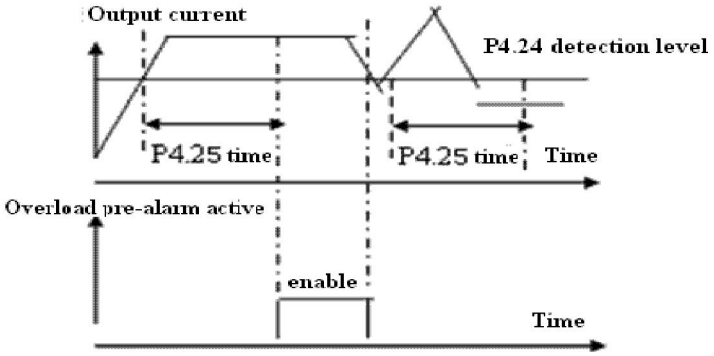


Fig.4-29 Overload pre-alarm

4-2-6. Protective function parameters（Group P5）

P5.00	**Motor overload protection mode selection**	**Range：0,1**	**0**

This parameter defines the protection mode when overload or overheat occurs.

0：Inverter locking output. When overload or overheat occurs, inverter will lock output and the motor will coast-to-stop.

1：Disabled. Motor will be without overload protection and inverter will do the overload protection for the motor.(Cautions to using)

P5.01	**Motor's overload protection coefficient**	**Range：20(%)－120(%)**	**100(%)**

This parmeter is used to set sensitivity of thermal relay protection from inverter to overload. When the output current value of load motor can

not match the rated current of the inverter, correct thermal protection can be realized by setting this parameter, as shown in Fig.4-30.
Use the following coefficient to calculate.

$$[P5.01] = \frac{\text{Motor rated current}}{\text{Inverter's rated output current}} \times 100$$

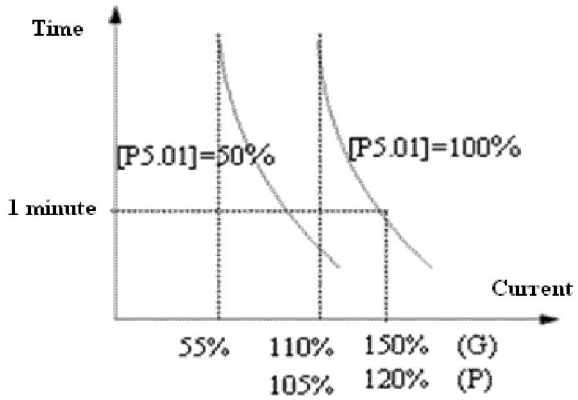


Fig.4-30 Thermal relay protection

Note : When one inverter run with multi-motors, inverter's thermal relay protection will be disabled. Therefore, please install thermal relay in the wire end of each motor to protect motor more efficiently.

P5.02	**Protection of over load at stall**	**Range：0,1**	**1**
P5.03	**Over voltage point at stall**	**Range：380V：120～150(%)** **220V：110～130(%)**	**140(%)** **120(%)**

0：Prohitit

1：Permit

During deceleration, the motor’s decelerate rate may be lower than that of inverter’s output frequency due to the load inertia. At this time, the motor will feedback the energy to the drive, resulting in the voltage rise on the inverter's DC bus. If no measures taken, the inverter will trip due to over voltage.

During the deceleration, the inverter detects the bus voltage and compares it with the over voltage point at stall defined by P5.03. If the bus voltage exceeds the stall overvoltage point, the inverter will stop reducing its output frequency. When the bus voltage becomes lower than the point, the deceleration continues, as shown in Fig.4-31.

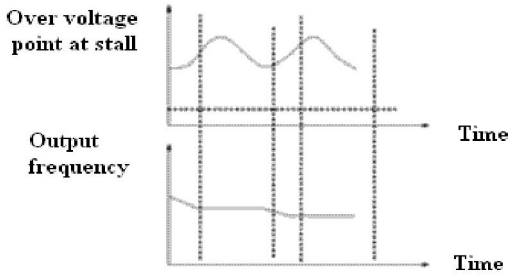


Fig. 4-31 Over voltage function

P5.04	Auto current limiting threshold	**Range：110～200(%)**	**150(%)**
P5.05	Frequeny decrease rate when current limiting	**Range：0.00～99.99Hz／S**	**10.00Hz/S**
P5.06	Auto current limiting	**Range：0, 1**	**1**

	selection		

Auto current limiting function is used to limit the load current smaller than the value defined by P0.54 in real time. Therefore the inverter will not trip due to surge over-current. This function is especially useful for the applications with big load inertia or big change of load.

Auto current limiting threshold (P5.04) defines the threshold of auto current limiting.The range of it is a percentage of the inverter's rated current.

Frequency decrease rate when current limiting (P5.05) defines the rate of output frequency when the inverter is in auto current limiting status.

If the decrease rate is set too small, auto current limiting status may not be switched and overload fault may occur. If it is set too big, the frequency will change too sharply and thus the inverter may be in generating status for long time, which may result in overvoltage protection.

Auto current limiting function is always enabled in Acc or Dec process. Whether it is enabled in constant speed operating process is decided by auto current limiting selection (P5.06).

P5.06＝0, Auto current limiting function is disabled in constant speed operating process;

F5.06＝1, Auto current limiting function is enabled in constant speed operating process;

In auto current limiting process, the inverter's output frequency may change; therefore, when the inverter's output frequency is required to be

stable, this function is not recommended.

P5.07	**Setting of restart after power off**	**Range：0,1**	**0**
P5.08	**Holding time of restart after power off**	**Range：0.0～10.0S**	**0.5S**

P5.07 = 0，Restart after instantaneous power off is disabled.

P5.07 = 1，Restart after instanteaneous power off is enabled.

If instantaneous powe off (E-11 displayed in inverter's LED) occurs when inverter is in running status, after repowering, it will detect speed automatically and then restart after the reference holding time (set by P5.08). During the holding time of restart, the inverter will not start even if you input running command, while if you input stop command, the inverter will stop detecting and restarting.

P5.09	**Auto reset times of fault**	**Range：0～10**	**0**
P5.10	**Auto** reset **interval of fault**	**Range：0.5～20.0S**	**5.0S**

When the inverter is in running process, it may occur fault and stop output by accident for overload fluctuating.To avoid the pause of the device, you can use auto reset times of fault. In the reseting process, inverter will restart with detecting function. If the inverter can not reset to running successfully in the reference times, fault protection will be enabled and output will be stopped.

Note: (1) When use this function, make sure that it is permissible by device and there is no substantiality fault with inverter.

(2) This function is disabled with the fault protection caused by overload and overheat.

4-2-7. Fault recording parameters（Group P6）

P6.00	**Previous fault record**	**Range： 0~23**	**0**
P6.07	**2 latest fault record**	**Range： 0~23**	**0**
P6.08	**3 latest fault record**	**Range： 0~23**	**0**
P6.09	**4 latest fault record**	**Range： 0~23**	**0**
P6.10	**5 latest fault record**	**Range： 0~23**	**0**
P6.11	**6 latest fault record**	**Range： 0~23**	**0**

0：no fault

1～17：E-01～E-17 fault，refer to chapter 5 for fault types.

P6.01	**Output frequency of previous fault**	**Range：0～upper limit of frequency**	**0**
P6.02	**Setting frequency of previous fault**	**Range：0～upper limit of frequency**	**0**
P6.03	**Output current of previous fault**	**Range：0～999.9A**	**0**
P6.04	**Output voltage of previous fault**	**Range：0～999V**	**0**
P6.05	**DC injectiong bus voltage of previous fault**	**Range：0～800V**	**0**
P6.06	**Module temperature of previous fault**	**Range：0～100**	**0**

4-2-8.Close-loop control parameters (Group P7)

Analog feedback control system

Reference pressure is input via VI, and feedback value (4～20mA) of pressure sensor is input to inverter via CI. Also, there is an internal PI adjustor to form analog close-loop control system, as shown in Fig4-32.

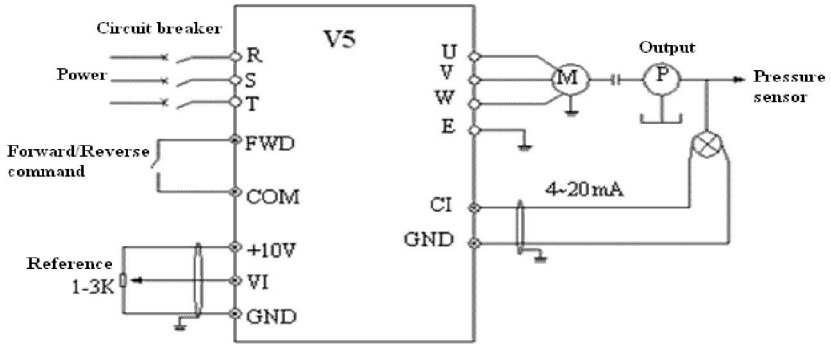


Fig.4-32 Analog feedback control system with internal PI

Principle diagram of inverter's internal PI is shown below:

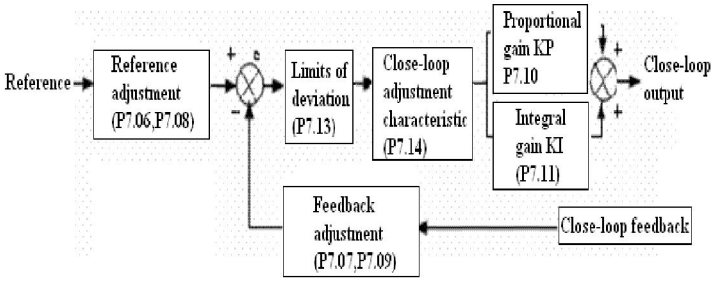


Fig. 4-33 PI block diagram

Close-loop reference, feedback, limits of deviation, proportional and integral parameters which are as same as common PI adjustment are defined in P7.01~P7.11. The relationship between reference and feedback are shown in Fig4-34, thereinto, 10V corresponds to 100% of reference and 20mA corresponds to 100% of feedback.

The aim of reference adjustment and feedback adjustment is to confirm the corresponding relationship and dimension of unification, as shown in Fig.4-33.

If the motor's speed is required to increases with the reference speed, this kind of control characteristic is called positive characteristic. On the contrary, if the motor speed is required to decrease when the reference value increases, this control characteristic is called negative characteristic.

The two close-loop characteristic can be set by P7.14, as shown in Fig4-35.

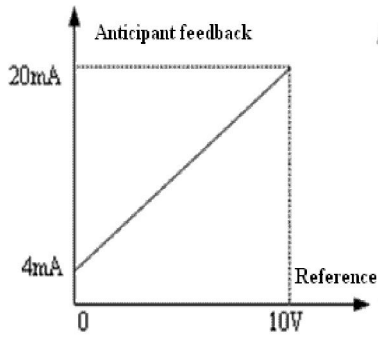


Fig.4-34 Reference and anticipant feedback

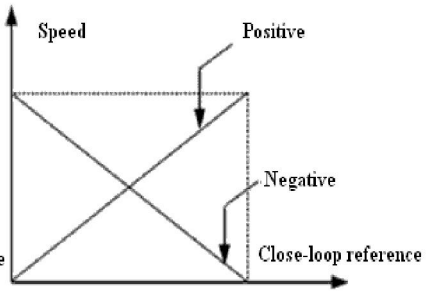


Fig.4-35 Close-loop adjustment characteristic diagram

After conforming the system, the procedure of setting close-loop

parameters is shown below:

(1) Confirm the close-loop reference and feedback channel (P7.01, P7.02).

(2) The relationship between close-loop reference and feedback value (P7.06~P7.09) should be defined for close-loop control.

(3) If reference and required motor's speed is opposite, please set close-loop characteristic as negative to confirm close-loop adjustment characteristic (P7.14=1), as shown in Fig4-35.

(4) Set the function of close-loop preset frequency (P7.16～ P7.17).

(5) Set close-loop filter time, sampling cycle T, limits of deviation and gain coefficient (P7.03, P7.04, P7.12, P7.13).

P7.00	Close-loop function selection	Range：0, 1	0

0：Close-loop control is disabled

1：PI close-loop control is enabled

P7.01	Reference channel selection	Range：0, 1, 2	1

0：Digit input

1：VI (0－10V)

2: CI. 0~10V voltage or 4~20mA current reference, for speed close-loop, analog reference of 10V corresponds to the synchronized speed of the motor's max output frequency.

P7.02	Feedback channel selection	Range：0~6	1

0：VI (0－10V)

1：CI

2：VI +CI

3：VI - CI

4：Min｛VI, CI｝
5：Max｛VI, CI｝

P7.03	**Reference filter**	**Range：0.01~50.00S**	**0.50S**
P7.04	**Feedback filter**	**Range：0.01~50.00S**	**0.50S**

Both the external reference signal and feedback signal have interferences, while these can be filtered by setting the time constant of filter (P7.03 and P7.04), the longer the filter time, the better the immunity capability, but the slower the response; on the contrary, the shorter the filter time , the worse the immunity capability, but the quicker the response.

P7.05	**Set reference in digital mode**	**Range：0.00－10.00V**	**0.00V**

If P7.01=0, the value set by P7.05 will be as the reference of close-loop control system. Therefore, you can modify the value of P7.05 to change if via operation keyboard or serial port.

P7.06	**Min reference**	**Range：0.0－Max reference**	**0.0%**
P7.07	**Feedback value corresponding to min reference**	**Range：0.0－100.0(%)**	**0.0%**
P7.08	**Max reference**	**Range：min reference -100.0(%)**	**100.0%**
P7.09	**Feedback value corresponding to max reference**	**Range：0.0%－100.0(%)**	**100.0%**

P7.06～P7.09 define the relationship curve of analog close-loop reference and expecting feedback.The reference value is the percentage of real value of feedback corresponding to benchmark value (10V or

20mA), as shown in Fig.4-36.

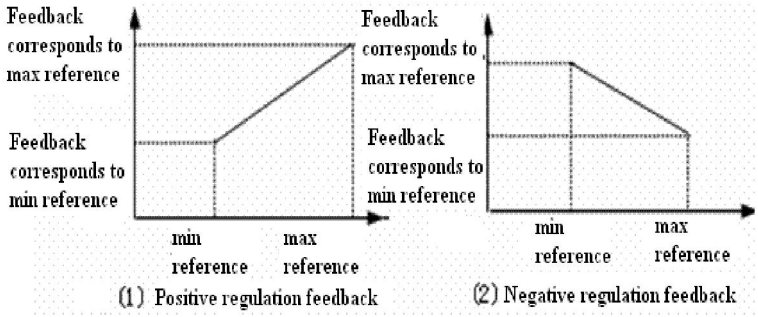


Fig. 4-36 reference and feedback curve

P7.10	**Proportional gain KP**	**Range：0.000~9.999**	**0.050**
P7.11	**Integral gain KI**	**Range：0.000~9.999**	**0.050**
P7.12	**Sampling cycle T**	**Range：0.01－10.00S**	**1.00S**

The bigger the proportion gain KP, the quicker the response, while too bigger of it may lead to surge easily.

As only with proportiaon gian KP, deviation can not be eliminated, integral gain KI can be used to to form PI control to eliminate the deviation. The bigger of the Ki, the quicker the response of changing deviation, while too big of the Ki may lead to surge easily.

Sampling cycle T is the sampling cycle of feedback value.PI regulator calculate once in every sampling clcle, the longer the cycle , the slower the response.

P7.13	**Limits of deviation**	**Range：0.0－20.0(%)**	**2.0(%)**

The max deviation value of close-loop reference is shown in Fig.4-37, if the feedback value is within this range, PI regulator will stop operation. This function is useful to improve accuracy and stability of the system.

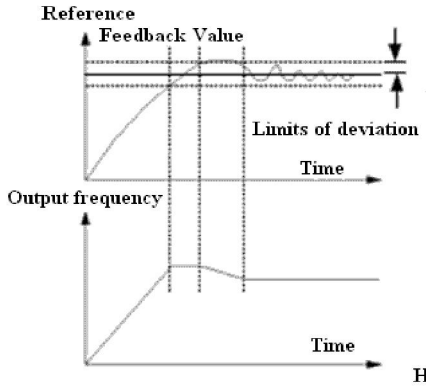


Fig.4-37 Limits of deviation

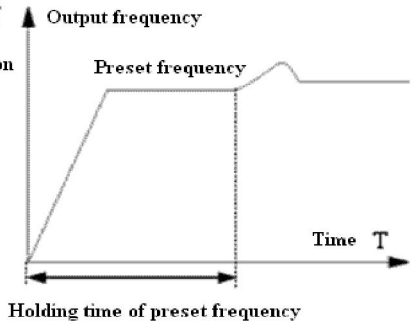


Fig.4-38 close-loop preset frequency

P7.14	Close loop adjustment characteristic	Range：0, 1	0

0: Positive. When the reference increases, it will be enabled when the motor speed increase.

1: Negative. When the reference increases, it will be enabled when the motor speed reduces

Note：Define the relationship of reference and speed.

P7.15	Integral adjustment selection	Range：0, 1	0

0： Stop integral adjustment selection when the frequency reaches upper limit or lower limits

1： Continue the integral adjustment selection when the frequency reaches high limit or lower limits

For the system need quick response, cancel the continuouse integral

adjustment is recommended.

P7.16	**Close-loop preset frequency**	**Range：0－upper limit of frequency**	**0.00Hz**
P7.17	**Holding time of close-loop preset frequency**	**Range：0.0－250.0S**	**0.1S**

This function can make the close-loop adjustment enter stable stage quickly.

When the close-loop starts, the frequency will accelerate to the preset value set by P7.16 according to Acc time and the inverter will running with this freuquency in the holding time set by P7.17, then running according to close-lood character, as shown in Fig4-38.

Note：If the function of close-loop preset frequency is not needed, you can set the preset frequency and holding time as 0.

P7.18	**PI Threshold of zero-frequency operation**	**Range：0.00－500.0Hz**	**0.01Hz**
P7.19	**PI hysteresis of zero-frequency operation**	**Range：0.00－500.0Hz**	**0.01Hz**

The two function parameter is used for setting PI threshold and hysteresis of zero-frequency operation.

If you set the frequency as 0 Hz, PI threshold of zero-frequency operation will be disabled.

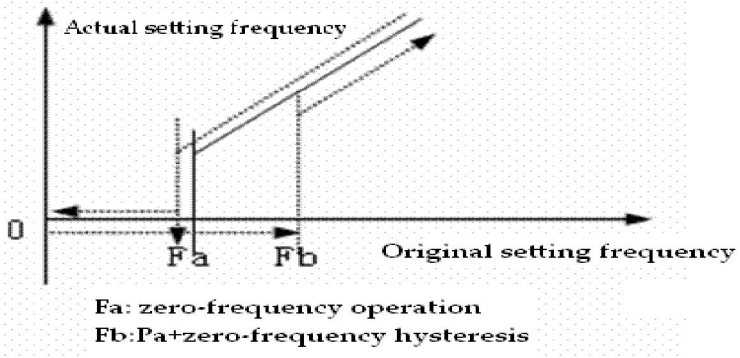


Fig.4-39 zero-frequency hysteresis

As shown in Fig.4-39

Start process：

After start command is set out, the motor will start and accelerate to the frequency in the Acc time until the setting frequency reach or exceeds the certain value Fb.

Stop process：

The inverter will not stop immediatelyif the setting frequency is lower than Fb, only when the setting frequency reach Fa, the inverter will stop output.

Fa points to zero-frequency threshold which is defined by P7.18, the value among Fb-Fa point to zero-frequency hysteresis which is defined by P7.19.

This function can enable the inverter to enter domant state so as to save energy, besides, the inverter will not start at the threshold of

zero-frequency operation if the hysteresis is set properly.

4-2-9. Simple PLC operation parameters.（Group P8）

Simple PLC function can enable the inverter to change its operating frequency and directions automatically to satisfy the manufacturing requirements, as shown in Fig4-40.

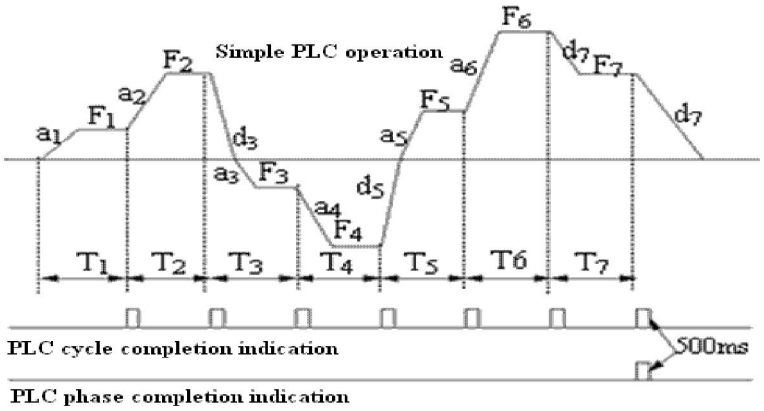


Fig.4-40 Simple PLC diagram

In Fig,4-40，a_1~a_7、d_1~d_7 are the Acc/Dec time of different stages and they are set by Acc/Dec time parameters P0.17,P0.18 and P3.14～P3.2, F_1~F_7、T_1~T_7 are the running frequency and running time and they are set by P8.01～P8.14.

P8.00	**Simple PLC operation mode selection**	**Range(LED)： Unit's place ：0~3；Ten's place：0,1； Hundred's place: 0,1； Thousand's place：0,1**	**0000**

Unit's place of LED：PLC operation mode selection

0：Disabled.

1：Stop after operating for one cycle. As shown in Fig.4-41. If inverter stop after single cycle operation, running command should be give once again to start the inverter.

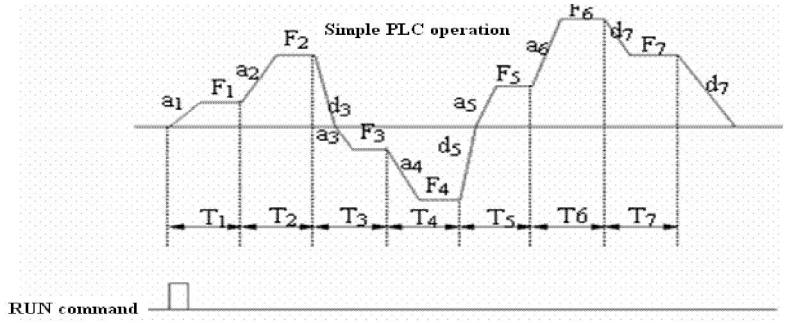


Fig. 4-41 PLC stop mode after single cycle of operation

2：Holding at the final value after single cycle of operation**.** As shown in Fig.4-42，Inverter will keep the running frequency, direction of the last setting automatically after single cycle is completed, then it will stop with the reference Dec time if stop command is input.

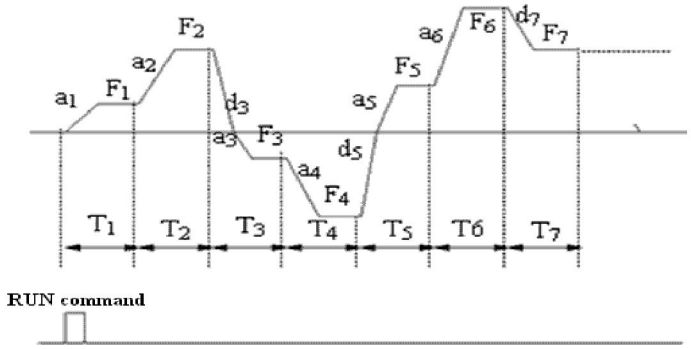


Fig. 4-42 PLC holding mode after single cycle

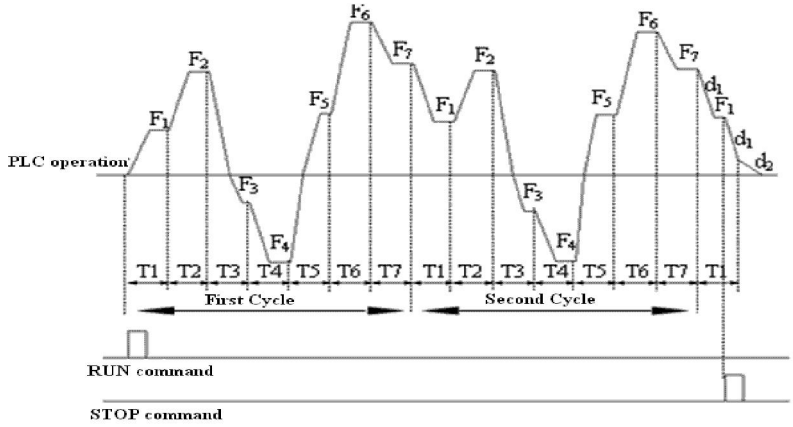


Fig. 4-43 PLC operate continuously mode

3: Operate continuously. As in Fig.4-43，inverter start next cycle automatically after operating for one cycle, it will stop until stop command is input.

Ten's place:

Restarting mode after stopping

0：Run again for stage 1

1： Continue to run from the stopping stage

Hundred's place：

Save at power off

0：Not saving

1：Save the time and frequency at power off

Thousand's place: Selecting the unit of time

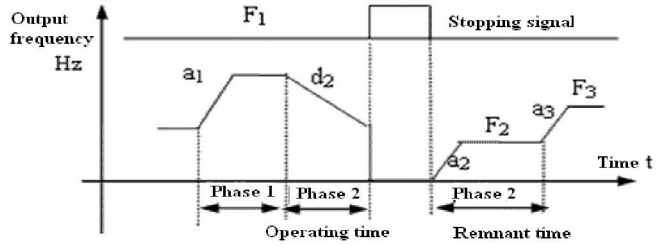
0: second

1: minute

Ten's place of LED：PLC restarting mode after stopping

0: Run again from stage 1**.** Inverter will start to run from stage 1 if the stop is caused by stop command, fault or power off.

1: Continue to run from the stopping stage**.** For the stop caused by stop command or fault, inverter will recorc the time in current phase automatically, then restart to enter this stage with the same frequency and run continuously in the rest time, as shown in Fig.4-44.



a1：Acc time of stage1 a2：Acc time of stage2 a3：Acc time of stage3
d2：Dec time of stage2 F1:Frequency of stage1 F2:Frequency of stage2 F3:Frequency of stage3

Fig.4-44 PLC start mode 1

Ten's place of LED：Save at power off

0：Not saving. The inverter does not save the PLC operating status after power off and restart to operate in first stage.

1：Save. Save the operating parameters of PLC operation after power off, including the operating stage, operating frequency and operating time. The inverter will continue to operate in the mode defined by the ten's place.

Thousand's place of LED：PLC running time

0：second

1：minute

This unit only valid for the definition of PLC running time. The unit of Acc/Dec time durning PLC is running is set by P0.16.

Note：(1) This stage is invalid when the PLC running time is set as 0.

(2) You can control pause, invalidation, run and others for the PLC process via terminals, refer to group P4 for details.

P8.01	**Stage 1 setup**	**Range：000－621**	**000**
P8.02	**Operating time of stage1**	**Range：0.1－6000.0**	**10.0**
P8.03	**Stage 2 setup**	**Range：000－621**	**000**
P8.04	**Operating time of stage 2**	**Range：0.1－6000.0**	**10.0**
P8.05	**Stage 3 setup**	**Range：000－621**	**000**
P8.06	**Operating time of stage 3**	**Range：0.1－6000.0**	**10.0**
P8.07	**Stage 4 setup**	**Range：000－621**	**000**
P8.08	**Operating time of stage 4**	**Range：0.1－6000.0**	**10.0**
P8.09	**Stage 5 setup**	**Range：000－621**	**000**
P8.10	**Operating time of stage 5**	**Range：0.1－6000.0**	**10.0**
P8.11	**Stage 6 setup**	**Range：000－621**	**000**
P8.12	**Operating time of stage 6**	**Range：0.1－6000.0**	**10.0**
P8.13	**Stage 7 setup**	**Range：000－621**	**000**
P8.14	**Operating time of stage 7**	**Range：0.1－6000.0**	**10.0**

Frequency setup

0：Multi i（i＝1～7）

1: Frequency is decide by P0.01

Ten’s place of LED：Operating direction selection

0：Run forward

1：Run reverse

2：Decided by operating instructions

Hundred’s place of LED：Acc/Dec time selection

With the unit’s place, ten’s place and hundred’s place of LED,

P8.01~P8.14 defined the running frequency, direction and Acc/Dec time of PLC:

Unit's place of LED:

0：Multi-frequency i, i=1~7, defined by P3.26~P3.32.

1：Frequency is set by P0.01

Ten's place of LED：Operating direction selection

0：Run forward

1：Run reverse

2：Decided by operating instructions

Hundred's place of LED：Acc/Dec time selection

0：Acc/Dec time 1

1：Acc/Dec time 2

2：Acc/Dec time 3

3：Acc/Dec time 4

4：Acc/Dec time 5

5：Acc/Dec time 6

6：Acc/Dec time 7

4-2-10.Traverse and measure function parameters（Group P9）

Traverse operation is widely used in textile and chemical fiber industry. The typical application is shown in Fig. 5-37. Traverse operation process: First, the drive accelerates to the preset frequency of traverse operation (F6.02) within the Acc time and then waits for certain time (F6.03). The drive transits to the central frequency within Acc/Dec time, and at last the drive traverse according to the preset traverse amplitude (F6.04), jitter frequency (F6.05), traverse cycle (F6.06) and rising time of traverse operation (F6.07) until it receives a stopping command and stops within Dec time.

The central frequency is actually the preset frequency of simple

operation (except PLC, traverse operation, jog), multi-step speed operation or PLC operations;

Traverse operating function is disabled automatically in Jog operation or close-loop operation process.

If PLC operation and traverse operation start at the same time, the traverse operation is disabled when the drive transits from one PLC operating stage to another stage. The drive will accelerate to the preset frequency of PLC operation and then start traverse operation. The drive will decelerate to stop within the Dec time set in PLC operating stage.

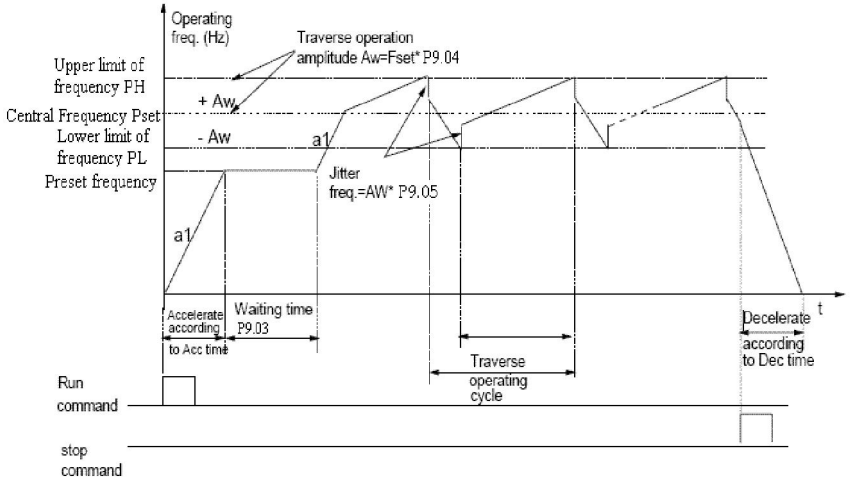


Fig.4－45 Traverse operation

P9.00	Traverse operation selection	Range：0, 1	0

0：Disabled

1：Enabled

P9.01	**Traverse operation control mode**	**Range：00～11**	**0**

Unit's place of LED：start mode

0：Auto mode. The inverter will running at preset frequency (P9.02) for certain time (P9.03), and then enter the traverse operation.

1：Manual mode. If the multi-function terminal (Xi is set to No.25 function) is enabled, the inverter will enter traverse mode. If the terminal is disabled, the drive will end traverse operation and operate at the pre-traverse frequency (P9.02).

Ten's place of LED：Traverse operating amplitude

0：Variable amplitude. Traverse operating amplitude AW changes with the central frequency and the change rate is defined by P9.04.

1：Fixed amplitude. Traverse operating amplitude AW is decided by max frequency and P9.04.

P9.02	**Pre-traverse frequency**	**Range：0.00－650.00Hz**	**0.00Hz**
P9.03	**Waiting time before pre-traverse frequency**	**Range：0.0－6000.0s**	**0.0s**

P9.02 is used to set running frequency before inverter enter traverse state.

If you select auto start mode, P9.03 is used to set the holding time with pre-traverse frequency before the inverter enter traverse state; if you select manual start mode，P9.03 is disabled. Refer to Fig. 4－45 for introduction.

P9.04	Traverse operating amplitude	**Range：0.0～50.0%**	**0.0%**

Variable amplitude：Aw＝Central frequency×P9.04

Fixed amplitude：Aw＝Max operting frequency P0.06×P9.04
Prompt：The traverse frequency will be limit by upper/lower limit of frequency, and the traverse operation will not work abnormally with unsuitable setup.

P9.05	**Jitter frequency**	**Range：0.0～50.0%**	**0.0%**

As shown in Fig4-45, there is no jitter frequency if P9.05 is set to 0.

P9.06	**Traverse operating cycle**	**Range：0.1～999.9s**	**10.0s**

It defines the time of a complete traverse operation cycle including rising and falling processes.

P9.07	Rising time of trangle wave	**Range：0.0～98.0%**	**50.0%**

Running time of traverse rising stage＝P9.06×P9.07(s)，Time of falling stage＝P9.06×（1－P9.07）(s)。Refer Fig.4－45 for introduction
Note：You can select S-curve Acc/Dec mode along with traverse so as to make the traverse operating more smoothly.

P9.08	**Reference length**	**Range：0.000～65.535km**	**0.000(km)**
P9.09	**Actual length**	**Range：0.000～65.535km**	**0.000(km)**
P9.10	**Times of length**	**Range：0.001～30.000**	**1.000**
P9.11	**correction coefficient of length**	**Range：0.001～1.000**	**1.000**
P9.12	**Perimeter of shaft**	**Range：0.01～100.00(cm)**	**10.00(cm)**
P9.13	**Number of pulses per revolution**	**Range：1～9999**	**1**

This group of parameters are used for fixed length control.

The drive inputs counting pulses via terminals (X6, defined as function 35), and calculate length according to the number of pulses per revolution (P9.13) and perimeter of shaft (P9.12).

Calculated length＝Number of pulses÷number of pulses per revolution ×perimeter of shaft

The calculated length can be corrected through times of length (P9.10) and correction coefficient of length (P9.11), and the corrected length is the actual length.

Actual length ＝calculated length×correction coefficient of length÷ correcting coefficient of length

When actual length(P9.09)≥preset length(P9.08), the inverter will send out a STOP command to stop.When the inverter restarts, it needs to clear the actual length (P9.09) or modify actual length (P9.09)< Reference length (P9.08), otherwise the inverter will not start.

Note: (1)The actual length (terminal Xi is defined as function 36) can be cleared by multi-function input terminal. The actual length can be calculated only after this terminal is disconnected.

(2) Actual length (P9.09) will be saved after power off automatically.

(3) Function of stopping at fixed length is disabled if P9.08 I set as 0, but the calculated length is still effective.

4-2-11. Vector control parameters（Group PA）

PA.00	Motor auto-turning	Range： 0, 1	0

0：No turning

1：Static turning

PA.01	**Rated voltage of motor**	**Range：0～400V**	**Dependent on inverter's model**
PA.02	**Rated current of motor**	**Range：0.01～500.00A**	**Dependent on inverter's model**
PA.03	**Rated frequency of motor**	**Range：1～99Hz**	**Dependent on inverter's model**
PA.04	**Rated speed of motor**	**Range：1～9999 r/min**	**Dependent on inverter's model**
PA.05	**Polarity of motor**	**Range：2～48**	**Dependent on inverter's model**
PA.06	**Stator inductance of motor**	**Range：0.1～5000.0mH**	**Dependent on inverter's model**
PA.07	**Rotor inductance of motor**	**Range：0.1～5000.0mH**	**Dependent on inverter's model**
PA.08	**Exciting inductance of motor**	**Range：0.1～5000.0mH**	**Dependent on inverter's model**
PA.09	**Stator resistance of motor**	**Range：0.001～50.000Ω**	**Dependent on inverter's**

			model
PA.10	**Rotor resistance of motor**	**Range：0.001～50.000Ω**	**Dependent on inverter's model**

PA.01~PA.10 are set as motor parameters which have default setting dependent on inverter's modle by the factory, you can reset these parameters according to the motor parameters of yours. PA.01~PA.10 are used for vector control, which should be input correctly so as to realize the expecting effect.

PA.11	**Over current protection coefficient of torque**	**Range： 0～15**	**15**

In vector control, this parameter is used to control torque current to avoid over current, 0~15 correspond to50%~200%.

PA.12	**Percentage adjustment coefficient of speed deviation**	**Range：50～120**	**85**
PA.13	**Integral adjustment coefficient of speed deviation**	**Range：100～500**	**360**

In vector control, PA.12~PA.13 are used for control motor speed.Adjust the two parameters can realize better effect for motor speed control.

PA.14	**Vector torque boost**	**Range：100～150**	**80**

In vector control, this parameter is used for boosting motor's output torque. You can increase this parameter to boost motor's output torque in the place with too heavy load.

4-2-12. Specail application function parameters（Group PB）

PB.00	Jog frequency source	Range： 0～4	0

0：P3.06
1：Panel potentiometer
2：P0.02
3：VI
4：CI

PB.01	selection of forward/ reverse dead time	Range： 0,1	0

0：Dead time is enabled. According to the value set by P0.05 with the minimum value 0.1S。

1：Dead time can be set to 0（no dead time）. You should set P0.05=0.0s，P0.20≥0.5Hz。（P0.17≤0.5S，P0.18≤0.5S，P0.20≥2.0Hz，P2.01≥2.0Hz）。This function is usually used in the control process of continuous to-and-for control. If swift turn-around is needed, reduce the Acc/Dec time and increasethe lower limit of frequency/start frequency.（P0.17≤0.5S，

P0.18≤0.5S，P0.20≥2.0Hz, P2.01≥2.0Hz）.

PB.02	Inverter type select	range： 0、1	0

0: G type (normal), used in normal situation

1: P type (wind machine,water pump), used in wind machine, water pump and other small load situation. Under this mode, power will improve 1 time, if the machine power is 2.2KW, under P type mode, the power will be 3.7KW. Please note P0.22 should be set as 3.

PB.03	Run mode	range： 0、1	1

0: before power on, if the point is short, run the inverter immediately.

1: before power on, if the point is short, run the inverter after cut off the point and connect it again.

4-2-13. Factory setting（Group PF）

PF.00	Default password	—	—

PF.01	User's password	Range：0000～9999	0000

This parameter can be protect against unauthorized personnel to view or modify function parameters.

If user's password don't need, you can set 0000 as its value.

If usre's password is needed, input four figures as password ,then press to con

e password will be valid immediately.

Modification:Press MENU ESC key to validate password, with correct password you can enter parameter editing status.After selecting PF.01 (PF.01=0000) , input new password and press ENTER DATA to confirm，then the password will be valid immediately. The password for super user is “2644”.

PF.02	**Software version**	**－**	**－**

Software version is set by factory and it can not be modified by user.

5 Fault Diagnosis and Countermeasures

5-1. Fault diagnosis and countermeasurs

When fault occurs, the function code and its contents will be shown in LED display, the protection function starts, the inverter stops outputting and the fault relay contact point is activated.Before seeking services, the subscriber may conduct the self-check according to the prompt given in this section, analyze the fault causes, and find out the solutions.If the fault belongs to the causes described in the broken line box, please seek the service by contacting the inverter agent or directly contacting our corporationl.

Table 5-1 Fault content and countermeasures

Fault Code	Fault Type	Possible reason of fault	countermeasure
E-01	Over-current during acceleration	Too heavy the load and too short the Acc time	Prolong the Acc time
		V/F curve is not suitable	Adjust V/F curve
		The rotating motor restarts after stop	Set as “start on fly” function
		Too large the value of torque boost	Adjust the value of manual torque boost or change it as auto
		Inverter power is too low	Select a high power inverter
E-02	Over-current during deceleration	Too short Dec time	Prolong the Dec time
		The load generates energy or the load inertial is too big	Connect suitable braking kit
		Inverter power is too low	Select a high power inverter

E-03	Over-current during constant speed	Sudden change of load	Check and reduce the change of load
		Too short Acc/Dec time	Prolong Acc/Dec time
		Abnormal load	Check the load
		AC supply voltage is low	Check AC supply voltage
		Inverter power is too low	Select a high power inverter
E-04	Over-voltage durning acceleration	Abnormal input voltage	Check input voltage
		Too short Acc time	Prolong Acc time
		The rotating motor restarts after stop	Set as “start on fly” function
E-05	Over-voltage durning deceleration	Too short Dec time	Prolong Dec time
		The load generates energy or the load inertial is too big	Connect suitable braking kit
E-06	Over-voltage Durning constant speed operation	Abnormal input voltage	Check input voltage
		Too short Acc/Dec time	Prolong Acc/Dec time
		Abnormal change of input voltage	Install input reactor
		Too big the load inertial	Connect suitable braking kit
E-07	Inverter’s control power supply over voltage	Abnormal input voltage	Check input power or ask for service
E-08	Inverter overheat	Vent obstructed	Clean the vent
		Over temperature	Improve condition and decrease carrier frequency
		Fan does not work	Change the fan

		IGBT module is abnormal	Ask for help
E-09	Inverter overload	Too short Acc time	Prolong Acc time
		DC injection braking current is too big	Reduce DC injection braking current and prolong braking time
		V/F curve is not suitable	Adjust V/F curve and torque boost value
		The rotating motor restarts after stop	Set “start of fly” function
		Low AC supply voltage	Check AC supply voltage
		Too heavy load	Select a high power inverter
E-10	Motor overload	V/F curve is not suitable	Adjust V/F curve and torque boost value
		Low AC supply voltage	Check AC supply voltage
		Common motor has operated with heavy load at low speed for a long	Select motor with frequency conversion if it requires to operate for a long time
		Unsuitable motor’s overload protection coefficient	Set motor’s overload protection coefficient correctly
		The motor is blocked or the load is too big	Check load
E-11	Low voltage durning operating	Too low AC supply voltage	Check AC supply voltage

E-12	IGBT protection	Instant over current of inverter	Refer to countermeasure of over current
		Short-circuit among 3-phase output or line-to-ground short circuit	Rewiring
		Vent is obstructed or fan is damaged	Clean the vent or change the fan
		Over-temperature	Reduce environment temperature
		Wires or connectors of control board are loose	Check and rewiring
		Current waveform distorted due to output phase loss	Check wiring
		Auxiliary power is damaged and inverter voltage is low	Seek factory or agent for service
		Abnormal control board	Seek factory or agent for service
E-13	Peripheral equipment fault	Emergency stop for peripheral equipment terminal close	Break external fault terminal after dealing with the external fault
E-14	Current detection circuit has fault	Wires or connectors of control board are loose	Check and rewiring
		Auxiliary powe is damaged	Seek factory or agent for service

		Hall sensor is damaged	Seek factory or agent for service
		Amplifying circuit is abnormal	Seek factory or agent for service
E-15	RS485 Communication error	Baud rate is not suitable	Set suitable baud rate
		Serial port communication error	Press STOP RESET key to reset，or seek service
		Improper setting of alarm parameter	Modify the setting of P3.09～P3.12
		Host PC does not work	Check host PC, check the wiring
E-16	System disturbance	Severe disturbance	Press STOP RESET key to reset or install power filter at the input side of the inverter
		W/R error of DSP in main control board	Press keys to reset or seek service
E-17	E^2PROM W/R error	W/R error of control parameter	Press STOP RESET key to reset or seek service
E-18	DC brake overcurrent	Set wrong current of DC brake	Decrease the brake current %

E-24	Main circuit lack voltage,the electromagnetic contacter action error	Lack of phase when input current, momentary power off, power supply point loose, power supply voltage fluctuates serious and make the main circuit contacter open	Check the reason and reset Check the power supply Ask the factory
E-30/31	Lack of phase when inverter running or stop	Input power supply lack of phase, momentary power off, power supply point loose, power supply voltage fluctuates serious and make the voltage between phases unbalance	Check the reason then reset
EEEE	Panel communication error	Operate panel and CPU board connection is not good, the control circuit of inverter is not good	Uninstall the operate panel and install again, ask the factory for help

5-2. Fault records

This series inverter records the codes of latest 6 fault and operating parameters of last 1 fault which can be help for finding the possible reason of faults. All of these fault informations are saved in group P6. Please refer operation methord of keyboard to enter group P6.

5-3. Fault reset

Once the fault occurs, select one of the following operations to restart the inverter:

(1) When fault code displayed in the operation panel, press STOP RESET key after you confirm the inverter can be reset.

(2) After setting one terminal among X1～X8 as external RESET input (P4.00～P4.07=17), connect it with COM terminal and then disconnect them.

(3) Cut off the power supply

Note：

(1) Please make sure you know the reason of the fault and get rid of it before resetting, otherwise the inverter may be damaged permanently.

(2) If the inverter can not be reset or fault reoccurred after resetting , please check the reason as the inverter may be damaged by resetting continuously.

(3) Delay 5 minutes to reset when overload and overheat protection are enabled.

6 Maintenance

6-1. Maintenance

Environment effections such as ambient temperature, humidity, fog ,internal component aging and other factors will give rise to the occurrence of potential faults. Therefore, it is necessary to conduct daily check and routine maintenance to the inverters.

6-1-1. Routine maintenance

Please confirm the following items when start the inverter.

(1) If there is abnormal noise and vibration with th motor.
(2) If the inverter and motor heat unusually.
(3) If the environment temperature is too high.
(4) If the value of load amperometer is as usual.
(5) If the fan of inverter can operate normally.

6-2. Periodical care and maintenance

6-2-1.Periodical care

Before check and maintenance the inverter, please make sure that the inverter is power off, monitor has no display content and the indication lamp of main circuit power is off.The checked contents are shown in Tabel 6-1.

Table 6-1 periodical maintenance

Items	Contents	Countermeasures
Main circuit terminals, control circuit terminals	If the screws are loose	Tighten the screws with screw drivers
Heatsink	If there is dust	Use dry compressed air with 4～6kgcm^2 pressure
PCB print circuit board	If there is dust	Use dry compressed air with 4～6kgcm^2 pressure
Cooling fan	There is abnormal noise, vibration, or if it has run for more than 20 000 hours.	Change cooling fan
Power component	If there is dust	Use dry compressed air with 4～6kgcm^2 pressure
Aluminium electrolytic capacitors	If it has changed color , particular smell or bubble	Change aluminium electrolytic capacitors

6-2-2. Periodical maintenance

To make the inverter work normally for long time, periodical care and maintenance for inverter's internal electronic component should be done. The electronic component's lifetime depends largely on their application environment and preservation. Normally, lifetime is:

Table 6-2 Lifetime of inverter components

Component	Life
Cooling fan	2～3 year
Electrolytic capacitors	4～5 year
Print circuit boare	5～8 year
Fuse	10 year

The usage conditions of the above components are shown below:

（1） Environmental temperature:30℃ as average.

（2） Load coefficient：below 80%.

（3） Running time ：below 12 hour per day.

6-3. Warranty of the inverter

Xinje electronic Co.,Ltd will offer warranty service in the case of the following situations:

(1) The warranty clause is only confined to the inverter;

(2) We will take the responsibility of 15 months defects liability period for any faults or damages under the normal operation conditions. After15 months, maintenance will be charged;

(3) Even within 15 months, maintenance would be charged under the following conditions:

Inverter is damaged due to incorrect operation, which are not in compliance with “User Manual”;
Inverter is damaged due to fire, flood, abnormal voltage and so on;
Inverter is damaged due to wiring fault.
Inverter is damaged due to the improper use of drive functions;
(4) Service fee will be charged according to the actual costs. If there are any maintenance contracts, the contract prevail.

7 Communication Protocol

7-1. Overview of communication protocol

These series inverter supply RS485 communication port and adopt MODBUS startded communication protocol. Therefore, the inverter can be set as a slave to communicate with the marter (such as PLC and PC) which has the same communicatin port and protocol; also, user can use a inverter as the master to communicate with several inverters produced by our company via RS485 port to realize multi-machine linkage. Besides, you can connect the RS485 port to remote keyboard to realize remote operation.

This inverter support MODBUS-RTU, the following is the particular instruction for the inverter’s communication protocol.

7-2. Instruction of communication protocal

7-2-1. Communicating mode

Inverter as a slave

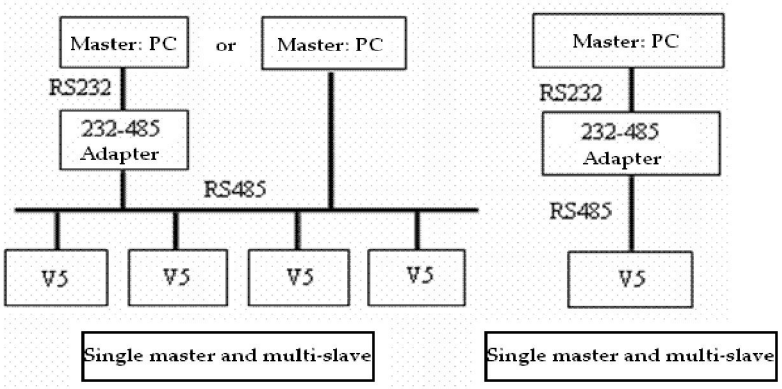


Fig.7－1　Networking diagram of inverter

Multi-device linkage

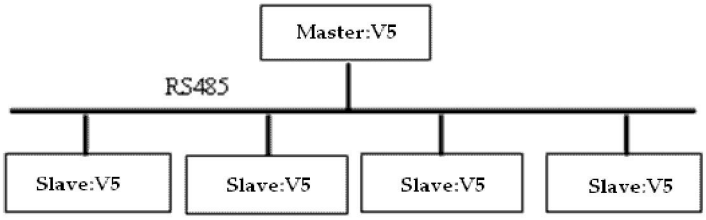


Fig 7-2 Networking diagram of multi-device linkage

7-2-2. Communication modes

The inverter can be used as both master and slave in RS485 net. If it is used as a master, it can control other inverters made by our company to realize multi-machine linkage.If it is used as a slave, PC or PLC can be set as a master to control it. The concrete communication modes are shown below:

(1) The inverter is a slave in the network. It communicates in 'point to point' mode. The inverter will not response to the command sent by the master via broadcast address.

(2) The inverter is a master in the network, the slave will not response to the command sent by the inverter via broadcast address.

(3) Users can set the inverter's current address, baud rate and data format by using the inverter's keypad or through the serialcommunication port.

(4) The drive can report the current fault information when polled by the master.

7-2-3. Mode of communication port

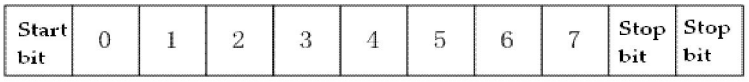
RS485, asynchronous, semi-duplex

Default: 1bit of start bit, 8 bits of data bit, 1 bit of stop bit, 9600bps. See Group P3.09～P3.12 for parameter settings.

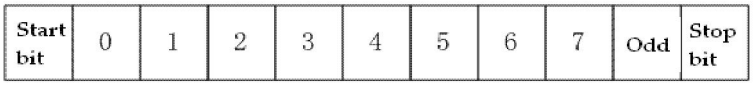
7-3.Modbus-RTU communication protocol

7-3-1. Structure

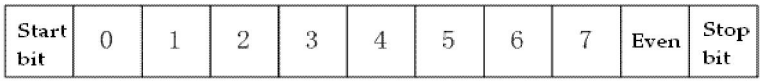
(1－8－2 format，None)



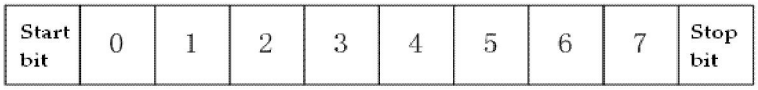
(1－8－1 format ，Odd)



(1－8－1 format，Even)



(1－8－1 format，None)



7-3-2. Communication information

1. RTU mode：

START	Keep the time no signal >=10ms
Address	Communication address：8-bit binary address
Function	Function code：8-bit binary address

DATA（n - 1）	Data： N*8-bit data，N<=8，Max=8 bit
……	
DATA 0	
CRC CHK Low	CRC verify code
CRC CHK High	16-bit CRC verify code is combined by 2 code of 8-bit binary
END	Keep the time no signal >=10ms

2. Communication address：

00H：broadcast for all the inverters（broadcast）
01H：communicate with the inverter addressed 01
0FH：communicate with the inverter addressed 15
10H：communicate with the inverter addressed 16
By parity of reasoning……，max can reach 254（FEH）

3. Function code and Data：

03H：Read data from registers，can read several registers with the numbers less than 31 and only can read the data in the same group every time.
06H: Write data into the register.
08H: Diagnosis
10H: write several data to register

（1）Function code 03H：read register
For example：Read data from address2104H（Output current）：
RTU Mode：

Request mode		Response mode	
Address	01H	Address	01H

Function code	03H	Function code	03H
Register address	21H	Byte No.	02H
	04H		
Register No.	00H	Dada	00H
	01H		00H
CRC CHECK Low	CFH	CRC CHECK Low	B8H
CRC CHECK High	F7H	CRC CHECK High	44H

（2）Function code 06H：Write to register

For example：01H，write function code P0.02=50.00HZ.

RTU Mode：

Request mode		Response mode	
Address	01H	Address	01H
Function code	06H	Function code	06H
Register address	00H	Register address	00H
	02H		02H
Data	13H	Data	13H
	88H		88H
CRC CHECK Low	25H	CRC CHECK Low	25H
CRC CHECK High	5CH	CRC CHECK High	5CH

（3）Command mode：08H Diagnosis

This command is used for testing that if the communication between the client device (master) and inverter(slave) is normal.Inverter will sent the data to control device.

RTU mode：

Request mode	Response mode

Address	01H	Address	01H
Function code	08H	Function code	08H
Data	01H	Data	01H
	02H		02H
	03H		03H
	04H		04H
CRC CHECK Low	41H	CRC CHECK Low	41H
CRC CHECK High	04H	CRC CHECK High	04H

(4) function code 10H: write several data in the register

Note: V5/VB5 inverters only support one pack of data write.

For example: write P0.06=50.00Hz in inverter address 01H.

RTU mode:

Inquiry information format		Reply information format	
address	01H	address	01H
Function code	10H	Function code	10H
Register address	00H	Register address	00H
	06H		06H
Register quantity	00H	Register quantity	00H
	01H		01H
Byte quantity	02H		
Data	13H		
	88H		
CRC CHECK Low	ABH	CRC CHECK Low	E1H
CRC CHECK High	60H	CRC CHECK High	C8H

5. Verify code

RTU mode：Double bytes with hex

CRC field is the binary value has two bytes (16 bits), it is added to the message after calculating; when added, the first is low byte and the second is high byte, therefore, the last byte of the sended message is high byte.Then the receiving device cauculate CRC which has received message again and compared it with the value in CRC field.If the two values are not the same, the device will take this message as fault and abandond it without any responses, and then receive next frame data. Please refer to MODBUS protocol instruction for calculate method of CRC verification.

7-3-3.Communication parameter

Name	Parameter address	Function
Internal reference parameters	GGnnH	GG stands for parameter group，nn stands for parameter No.
Command to inverter（06H）	2000H	0001H：Running command（Forward）
		0002H：Forward command
		0003H：Reverse command
		0004H：Jog command（Forward）
		0005H：Jog forward command
		0006H：Jog reverse command
		0007H：Dec stop command
		0008H：Emergency stop command
		0009H：Jog stop command
		000AH：Fault reset command

	2001H	Set frequenc command via port
Monitor inverter's status (03H)	2100H	Read inverter's fault parameter
	2101H	Read inverter's status
		BIT0：stop indicate，0：Stop；1：Run
		BIT1: ,1：low voltage；0：normal
		BIT2:forward/reverse indicate,1：forward；0：reverse
		BIT3:jog indicate 1：jog；0: none
		BIT4:close loop control selection，1：close loop；0: none
		BIT5:traverse mode running flag，1：traverse；0：none
		BIT6:PLC running flag，1：PLC running ，0：no
		BIT7:Multi-speed running flag of terminals，1：Multi-speed；0: none
		BIT8:Common running flag，1：common running；0：no
		BIT9:Main frequency from communication interface，1：yes；0：no
		BIT10:Analog input from main frequency，1：yes；0：no
		BIT11:Running command from communication interface，1：yes；0：no
		BIT12:Password protection for parameters，1：yes；0：no
	2102H	Read inverter's reference frequency
	2103H	Read inverter's output frequency
	2104H	Read inverter's output current
	2105H	Read inverter's bus voltage
	2106H	Read inverter's output voltage
	2107H	Read motor's speed
	2108H	Read module temperature

	2109H	Read analog input via VI
	210AH	Read analog input via CI
	210BH	Read inverter's software version
	210CH	I/O terminal status
		Bit0：X1
		Bit1：X2
		Bit2：X3
		Bit3：X4
		Bit4：X5
		Bit5：X6
		Bit6：FWD
		Bit7：REV
		Bit8：OC
		Bit9：relay output
Read data from function code (03H)	GGnnH (GG：Group No. of function code nn :No. function code)	Inverter responses to the data (When use Modbus address, the nn must be turned into hex)
Write data to function code (06H)	GGnnH (GG：Group No. of function code nn :No. function code)	Data be wrote in the inverter (When use Modbus address, the nn must be turned into hex)

Take the following as examples:

Read function code P1.02：

01H，03H，01H，02H，00H，01H，CRC1，CRC2

Read the reference frequency of inverter：

01H，03H，21H，02H，00H，01H，CRC1，CRC2
Write function code P1.02，the write value is 1
01H，06H，01H，02H，00H，01H，CRC1，CRC2
Running command：
01H，06H，20H，00H，00H，01H，CRC1，CRC2

Definition of fault code：

Fault code	Instruction
01H	Fault function code. Inverter can not find ：03H，06H，08H。
02H	Fault data address. Inverter can not find data address
03H	Fault data. data over the limit

Note：The parameter address must in hex format, as the function codes of parameters are in decimal system, so you must let them turn to hex.For example, the Modbus address of function code P2.11 is 020BH.

THINGET

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